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Influence of Psychological Needs and Gaming Motivation on Well-Being of Adult Gamers

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Abstract

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Dissertation Submitted in Partial Fulfillment

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Abstract

Adult online gaming is a fast-growing global entertainment industry, and many gamers spend more time playing games and less time engaging in work or other activities, which negatively affects their lives and relationships. This quantitative study addressed how psychological needs and gaming motivation predicted gaming behavior, life satisfaction, and relationship satisfaction using a mediational model. The theoretical foundation was self-determination theory, which addresses how personal choices are influenced by internal factors, especially psychological needs and motivation. An online survey was used to collect self-reported data from a convenience sample of 935 adult gaming participants using the Basic Needs Satisfaction in General Scale, the Gaming Motivation Scale, the Satisfaction with Life Scale, the Relationship Assessment Scale, and a short demographic questionnaire. Results of multiple regression analyses indicated gaming motivation was a significant mediator of life satisfaction and relationship satisfaction. However, gaming motivation was not a significant mediator of gaming behavior. Findings of this study indicate that for online gamers, quality of life (life satisfaction and relationship satisfaction) is enhanced when gaming motivation is high, suggesting that joy of gaming can positively influence other aspects of life, when psychological needs (autonomy, competence, and relatedness) are positive as well.

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Dedication

This dissertation is dedicated to my family, Thomas Sterling, Annette Sterling, Hellaine Sterling, and Michelle Cyphers, and my friends who gave me daily encouragement.

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I extend my sincere appreciation to the members of my dissertation committee. Special thanks go to Dr. Fearrington for his weekly encouragement and guidance, which have helped me move closer to attaining my goal. The committee's prompt replies to my questions during this journey have allowed me to steadily move forward. My dissertation program would have reached a standstill if Dr. Marcus had not been willing to regularly share her methodology expertise. Her guidance on the use of instrumentation and her willingness to patiently answer my questions created a supportive, collegial environment. My thanks also go out to my family and friends for their emotional, proofreading, and material support whenever I needed it. I could not have completed this dissertation without their assistance. I am greatly appreciative and thankful to everyone who partnered with me.

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Chapter 1: Introduction to the Study

Virtual reality games and massively multiplayer online role-playing games (MMORPGs) have become extremely popular around the world. According to a state-of-the-industry report, 1.2 billion people play online games (Spilgames, 2013). The limited research available on this issue has shown that online gaming can negatively affect gamers' relationships and life satisfaction (Hertlein & Hawkins, 2012; Ryan, Ribgy, & Przybylski, 2006), and online gaming affects frequency and time spent gaming (Young, 2009). Several studies have shown that the number of hours that gamers spend playing online games affects them negatively (Kowert, Domahidi, Festl, & Quandt, 2014; Kuss, Louws, & Wiers, 2012; Ng & Wiemer-Hasting, 2005).

Although researchers to some extent have examined how gaming behavior (frequency and duration of time spent playing online games) affects gamers, there is a gap in the literature regarding the influence psychological needs and gaming motivation have on gaming behavior, life satisfaction, and relationship satisfaction. Lafrenière, Verner-Filion, and Vallernad (2012) defined gaming motivation as how motivated the gamer is at playing the game; motivation is a major aspect of why gamers play online games. Given the prevalence of online gaming, it is important to understand how gaming motivation influences other variables that are associated with online gamers.

Gaming motivation is the key to why online gamers play, and motivation is related to duration of play, so it is important to understand the relationship motivation has with other variables that impact online gamers. It is necessary to understand the gamer

population better to address potential problems that online gaming may pose for individuals' health or well-being. In this study, gaming motivation was the mediating variable; psychological needs was the predictor variable; and gaming behavior, life satisfaction, and relationship were the outcome variables. A mediator variable helps the researcher understand how another variable can influence or explain the specific relationship (Fairchild & MacKinnon, 2009). The current study included three models to examine the relationships between gamers' psychological needs and gaming behavior, life satisfaction, and relationship satisfaction.

The results of this study may offer a better understanding of the psychological needs, gaming motivation, and gaming behavior associated with online gaming that may affect the interpersonal lives of gamers. Moreover, findings may also encourage MMORPG video game developers to incorporate elements into their online games that may contribute to participants' well-being, including rest breaks and rewards for taking those breaks (Hussain & Griffiths, 2009b). This chapter includes the problem, purpose, theoretical framework, and nature of the study. I also present the research questions, hypotheses, assumptions, scope, limitations, delimitations, and significance of the study.

Background

Online gaming is one of the fastest growing forms of entertainment today. Each year it surpasses the annual revenues generated by Hollywood movie studios (Lafrenière, Vallerand, Donahue, & Lauigne, 2009). Yahoo Games (online) generates 18.7 million annual visitors in North America and more than 20.9 million annual users in the Asia-

Pacific region ("Worldwide Online," 2007). Current, popular online games include *World of Warcraft*, *City of Heroes*, *EverQuest 1* and *2*, *Lineage II*, *RuneScape*, *Guild Wars*, *Blade Mistress*, *Second Life*, *Lord of the Rings*, *Star Wars Galaxies*, *Sociolotron*, *Age of Conan*, *Warhammer*, *Requiem*, and *Dark Age of Camelot*. Lafrenière et al. (2009) stated that these games are complex, impressive, goal oriented, and engaging.

Online gaming can be broken into two main types: virtual reality games and MMORPGs. Online virtual reality games are Internet based and take place in a virtual reality environment that is consistently evolving and changing. They exist in a three-dimensional world where players develop avatars (virtual representatives) of themselves (Denault & Kienzle, 2011). MMORPGs are defined as virtual reality games that provide a naturalistic setting in which numerous gamers play simultaneously (Cole & Griffiths, 2007; Yee, 2006).

Although gaming began with desktop computers, the growth of laptops and mobile devices (smartphones, electronic tablets) has encouraged mobile gaming. In 2012, mobile gaming accounted for 13% of the time spent on games worldwide, resulting in 130 million hours of play per day (Information Solutions Group, 2012). In addition, 9% of the money spent on applications for these electronic devices was for games that have a gross monetary value of $5.8 billion (Information Solution Group, 2012).

A recent state-of-the-industry report indicated that by the end of 2013, 1.2 billion people would be playing games, and of those 700 million would be playing games online (Spilsgames, 2013). In the United States, this equates to 59% of the total population as

players of online games (Entertainment Software Association [ESA], 2014). These numbers depict an explosive and continuing growth in online gaming (Johnson, 2013). Along with the increase in the number of individuals who play online games, there has been an increase in the average number of online gaming hours played per week (NPD Group, 2014). Throughout the world more people are spending less time doing other activities than playing online games. The ESA (2014) stated that gamers who play more video games than they did 3 years ago are spending less time watching television (48% less), going to the movies (47% less), and watching movies at home (47% less).

Online gaming has been linked to problematic Internet use and, for some individuals, negative life outcomes (Morahan-Martin & Schumacher, 2000). According to Morahan-Martin and Schumacher (2000), problematic Internet use occurs when online gaming interferes with gamers' work, academics, or relationship satisfaction, and also causes them to experience distress and mood changes when playing games. One study indicated that 4% of gamers spent 50 hours per week playing online games (Griffiths, Davies, & Chappell, 2004), which interfered with daily functions such as sleeping. Ng and Wiemer-Hasting (2005) found that 58% of the participants who played MMORPGs for more than 8 hours continuously were losing sleep and were told by others that they spent too much time playing compared to non-MMORPG players.

Seok and Dacosta (2014) stated that it is difficult to distinguish excessive playing as a measure of problematic video game play time by itself; individuals must also look at possible pathological afflictions and whether gaming has become an obstruction in the

player's life. However, when players believe that online gaming has become a problem, some consequences of problematic use include sleep loss, spending less time with offline friends, and devaluing offline social relationships (Liu & Peng, 2009). Problematic users also report physical problems such as increased physical pain, forgetting to eat, and sleep disturbances (Ng & Wiemer-Hasting, 2005). Persons who spend much more time than normal playing games, such as 8 hours per day (Ng & Wiemer-Hasting, 2005), can also experience life problems such as low social engagement, time management issues, family and friend concerns, and missed days at work or school (Charlton & Danforth, 2007), as well as neglect of their studies and real-life social environment (Domahidi & Quandt, 2014).

Problem Statement

Research has indicated that excessive online gaming negatively affects gamers' quality of life in terms of consequences to physical well-being and lifestyle (Meerkerk, van den Eijnden, Franken, & Garretsen, 2010; Peng & Liu 2010; Teng, Chen, Chen, & Li, 2012; Young, 2009), weakened families and communities (Huang, 2010), and death (Kwon, Chung, & Lee, 2011). Excessive online gaming has caused academic and work problems (Beranuy, Carbonell, & Griffiths, 2013), and interpersonal conflicts (Hussain & Griffiths, 2009a). Some online gamers have developed mental health issues (Baird, 2010; Davis, 2001; Freddolino & Blaschke, 2008) and worsening health (Peng & Liu, 2010; Smyth, 2007) due to excessive online game playing. Online gaming can also affect gamers' relationships, including issues with intimacy (Cole & Griffiths, 2007; Hawkins

& Hertlein, 2013; Scott, Monttarella, & Lavooy, 2006) and neglect of real-life friends (American College Health Association, 2005; Hertlein & Hawkins, 2012; Lo, Wang, & Fang, 2005; Ryan & Deci, 2000b; Young, 2009).

Most of these studies have focused on the consequences of gaming behavior on quality-of-life constructs. However, what is missing from the literature is a more sophisticated understanding of how social psychological factors such as psychological needs and gaming motivation influence gaming behavior (frequency and duration of time spent playing online games) as well as quality-of-life indicators such as life satisfaction and relationship satisfaction. Research has shown that gamers with low psychological needs seem to engage in longer online gaming sessions (Senol-Durak & Durak, 2011), suffer from more negative moods while playing (Kwon et al., 2011), and experience depressed moods and low satisfaction as a result of excessive playing (Meerkerk et al., 2010; Senol-Durak & Durak, 2011). Gaming motivation may be the key due to how motivation determines the duration and frequency with which online gamers play. Gaming motivation could explain the relationship between the gamers' psychological needs and gaming behavior, life satisfaction, and relationship satisfaction.

Purpose of the Study

The purpose of this quantitative study was to examine three mediational models to better understand the relationship between psychological needs, gaming behavior, and quality of life. The first model addressed the relationship between online gamers' psychological needs (predictor variables) and their gaming behavior (outcome variable).

The second model addressed the relationship between online gamers' psychological needs (predictor variables) and their life satisfaction (outcome variable). The last model addressed the relationship between online gamers' psychological needs (predictor variables) and their relationship satisfaction (outcome variable). In the three models, gaming motivation, as measured by the Gaming Motivation Scale (GAMS), was examined as a possible mediator between the predictor variable and the outcome variable.

Research Questions and Hypotheses

The research questions of this study addressed three mediational models. According to Baron and Kenny (1986), a mediator is

> a given variable [that] may be said to function as a mediator to the extent that it accounts for the relation between the predictor and the criterion. Mediators explain how external physical events take on internal psychological significance . . . mediators speak to how or why such effects occur. (p. 1176)

Each mediational model included two hypotheses.

The independent variables were psychological needs, as measured by the Basic Needs Satisfaction in General Scale (BNSG-S). Each model included a separate dependent variable. The dependent variables were gaming behavior, life satisfaction, and relationship satisfaction. Gaming behavior was measured by self-reported frequency and duration of time spent playing online games. Life satisfaction was measured by the Satisfaction with Life Scale (SWLS). Interpersonal relationships were measured by the Relationship Assessment Scale (RAS). The mediating variable was gaming motivation,

which was measured using the GAMS. The data were collected from online gamers. The study addressed the following research questions (presented as models) and hypotheses:

Model 1: Does gaming motivation mediate the relationship between psychological needs and gaming behavior?

$H1_a$: Psychological needs (as measured by BNSG-S) significantly predicts online gamers' gaming behavior (as measured by frequency and duration).

$H1_0$: Psychological needs (as measured by BNSG-S) do not significantly predict online gamers' gaming behavior (as measured by frequency and duration).

$H2_a$: Gaming motivation (as measured by GAMS) mediates the relationship between psychological needs (as measured by BNSG-S) and gaming behavior (as measured by frequency and duration) among online gamers.

$H2_0$: Gaming motivation (as measured by GAMS) does not mediate the relationship between psychological needs (as measured by BNSG-S) and gaming behavior (as measured by frequency and duration) among online gamers.

Model 2: Does gaming motivation mediate the relationship between psychological needs and life satisfaction?

$H3_a$: Psychological needs (as measured by BNSG-S) significantly predicts online gamers' life satisfaction (as measured by SWLS).

$H3_0$: Psychological needs (as measured by BNSG-S) do not significantly predicts online gamers' life satisfaction (as measured by SWLS).

$H4_a$: Gaming motivation (as measured by GAMS) mediates the relationship between psychological needs (as measured by BNSG-S) and life satisfaction (as measured by SWLS) among online gamers.

$H4_0$: Gaming motivation (as measured by GAMS) does not mediate the relationship between psychological needs (as measured by BNSG-S) and life satisfaction (as measured by SWLS) among online gamers.

Model 3: Does gaming motivation mediate the relationship between psychological needs and relationship satisfaction?

$H5_a$: Psychological needs (as measured by BNSG-S) significantly predicts online gamers' relationship satisfaction (as measured by RAS).

$H5_0$: Psychological needs (as measured by BNSG-S) do not significantly predicts online gamers' relationship satisfaction (as measured by RAS).

$H6_a$: Gaming motivation (as measured by GAMS) mediates the relationship between psychological needs (as measured by BNSG-S) and relationship satisfaction (as measured by RAS) among online gamers.

$H6_0$: Gaming motivation (as measured by GAMS) does not mediate the relationship between psychological needs (as measured by BNSG-S) and relationship satisfaction (as measured by RAS) among online gamers.

Theoretical Framework

Self-determination theory (SDT) was the theoretical framework on which the study was based. Guay, Delisle, Fernet, Julien, and Senècal (2008) described SDT as the

study of how self-worth may influence an individual's internal state of being and objectives for determining the way in which he or she wants to be regarded by others in society. A key facet of SDT is choice—specifically, personal choice. An individual will eventually make a choice (i.e., to play online games or not to play online games), and depending on the choice that person makes, he or she may realize the importance of modifying his or her current behavior. Personal choice is tied to motivation, and SDT is specifically concerned with the motivation behind the choices that a person makes without considering external inferences or influences.

Self-determination theory identifies three innate psychological needs—relatedness, autonomy, and competence—that individuals must respond to in order to realize their ideal effectiveness, growth, and functioning (Çankaya, 2009). In the framework of online gaming, researchers found that fulfillment of these three basic psychological needs predicted an individual's desire to continue playing those games (Ryan et al., 2006). Autonomy and competence affect the gamer's motivation, which is discussed below.

Motivation is a major aspect of why gamers play online games. According to SDT, there are two types of motivation: intrinsic and extrinsic. Intrinsic motivation includes performing an activity for the natural satisfaction derived from it. Extrinsic motivation, on the other hand, originates from an external source that has influence over the individual. Another study indicated that events that enhance an individual's sense of autonomy and competence support intrinsic motivation (Ryan & Deci, 2000a). During

online gaming, players are rewarded by the game as they play, which provides extrinsic motivation for them to keep playing (Ryan et al., 2006). Ryan et al. (2006) conducted four studies that applied SDT to examine how the motivation originating from computer games affected the game play and well-being of gamers. The first three studies included an individual playing certain games and indicated that the gamer's perceived competence and autonomy were associated with gaming motivation, the gamer's enjoyment, and the gamer's well-being. In the fourth study, Ryan et al. examined online gamers' experiences when playing multiplayer games and determined that relatedness, autonomy, and competence predicted game enjoyment and how much the gamer would play in the future.

The aforementioned studies represent some of the existing research that has included SDT to examine motivation and gaming. Ryan et al. (2006) focused only competence, autonomy, and relatedness, whereas the current study addressed gaming motivation as a whole using SDT. It is important to measure gaming motivation given that motivation is the driving force behind a person's actions (Rabideau, 2005). Gaming motivation may help to influence gamers' gaming behavior, life satisfaction, and relationship satisfaction by satisfying their needs through internal and external means. The relationship between psychological needs and outcome variables (gaming behavior, life satisfaction, and relationship satisfaction) was examined to determine whether gaming motivation was a mediator between these variables.

Nature of the Study

An online survey research design was used to collect self-reported data from a convenience sample of 935 participants recruited from various social media and chat rooms frequented by online gamers. This design was chosen because it was the only approach that would allow me to collect the needed information from online gamers who play online games (see Coyne, Chesney, Logan, & Madden, 2009; Denault & Kienzle, 2011; Noor & Lobeck, 2009) around the world. The predictors for the study were psychological needs and gaming motivation. Gaming motivation was the mediating variable. The outcome variables were gaming behavior, life satisfaction, and relationship satisfaction. Multiple regressions were used to analyze the data to determine whether there was a relationship between psychological needs and gaming behavior, life satisfaction, and relationship satisfaction. According to MacKinnon, Cheong, and Pirlott (2012) and Kenny (2014), multiple regressions are used to analyze mediating relationships. This study included a causal steps approach based on the work of Baron and Kenny (1986), which involved four steps of analysis to establish mediation. Bootstrapping was used to estimate indirect effects (Kenny, 2014).

Participants completed five measures: the Basic Needs Satisfaction in General Scale (BNSG-S; Gagné, 2003), the Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985), the Relationship Assessment Scale (RAS; Hendrick, Dicke, & Hendrick, 1995), the Gaming Motivation Scale (GAMS; Lafrenière et al., 2012), and a demographic questionnaire that asked participants about their gaming

behavior. Gaming behavior was measured by frequency and duration of time playing online games. Prospective participants were recruited through invitations placed on Facebook and listservs such as Stratics and IGN Vault Networks that have subsites for different MMORPGs and virtual reality games. The invitation included a brief description of the study; an informed consent letter was presented to participants before they began to complete the survey items.

Definition of Terms

For this study, the key terms employed were as follows:

Amotivation: Amotivation can be defined as a state of lacking any motivation to participate in an activity and is considered an absence or a failure to value the activity or its consequence (Deci & Ryan, 2008).

Autonomy: Autonomy is one of three basic psychological needs and represents the extent to which individuals identifies having control over their behaviors and outcomes (Ryan & Deci, 2004).

Competence: Competence is one of three basic psychological needs and entails the perception that one is both capable and effective at undertaking certain tasks with varying levels of challenges (Deci & Ryan, 2000; Johnston & Finney, 2010; Ryan & Deci, 2004).

Extrinsic motivation: Extrinsic motivation can be defined as doing an activity because it leads to a certain outcome (Ryan & Deci, 2012). Extrinsic motivation according to SDT is composed of four regulations: integrated regulation, identified

regulation, introjected regulation, and external regulation. Integrated regulation happens when identified regulations have been fully integrated; it also occurs through self-analysis, bringing new regulation into equivalence with a person's other ideals and wants (Ryan & Deci, 2000). Identified regulation is a behavior that emerges out of choice. With identified regulation, people are engaged in behavior based on its perceived meaning or its relation to personal goals (Lafreière et al., 2012). Introjected regulation refers to an internalization in which individuals take in a value or regulatory process but do not accept it as their own (Deci, Eghrart, Patrick, & Leone, 1994). Finally, external regulation refers to behaviors for which the locus of initiation is external to the person (e.g., an offer of a prize or a threat of being punished; Deci, Vallerand, Pelletier, & Ryan, 1991).

Gaming behavior: Gaming behavior is defined as the number of hours spent per week playing online games (Shieh & Cheng, 2007).

Gaming motivation: Gaming motivation can be defined as how motivated the gamer is to play the game. For this study, gaming motivation was based on the framework of SDT, which comprises the following motivations: intrinsic, extrinsic (integrated regulation, identified regulation, introjected regulation, external regulation), and amotivation (Lafreière et al., 2012). The summary score of the GAMS was used to assess gaming motivation.

Intrinsic motivation: Intrinsic motivation can be defined as engaging in an act or behavior that one finds pleasurable, interesting, or enjoyable (Bidee et al., 2012).

Life satisfaction: Life satisfaction can be thought of as a person's overall cognitive assessment of his or her family, health, and career, and anything else that affects his or her overall satisfaction with life (Drobnič, Beham, & Präg, 2010).

Psychological needs: Psychological needs include autonomy, competence, and relatedness, which are vital and essential to a person's well-being. Psychological needs are crucial for a person's cognitive structures and psychological growth (Ryan & Deci, 2000b).

Relatedness: Relatedness is one of three basic psychological needs and refers to a person's innate need to form relationships and connect with other people (Hutman, Konieczna, Kerner, Armstong, & Fitzpatrick, 2012).

Relationship satisfaction: Relationship satisfaction is determined by the manner, amount, and degree of success that a person experiences when interacting with other people (family, partners, and coworkers). In regards to relationship satisfaction, the individual deals with personality and situations that affect relationship development (La Guardia & Patrick, 2008).

Assumptions

I assumed that the instruments used in the study (BNSG-S, GAMS, SWLS, and RAS) were psychometrically sound assessment tools for measuring the identified constructs. I also assumed that the participants were capable of understanding and completing the demographic questionnaire and participating in online gaming. In this study there was no control over participant selection or data collection. I assumed that the

participants represented the population of interest and would cooperatively and appropriately participate in the study by accurately and truthfully responding to the questionnaires and not simply providing socially desirable answers.

Scope and Delimitations

The scope of this study was confined to individuals who belonged to online game forum sites, were at least 18 years old, played MMORPGs or virtual reality games online, and agreed to participate in the survey given in English. It was possible that some gamers who met the criteria chose not to participate in the study, resulting in a sample with unknown sampling error. This means that caution was used in interpreting the generalizability of the findings.

The constructs chosen for the study were attributes that could not be manipulated or controlled in an experimental or quasi-experimental design; therefore, the study was weak with respect to internal validity. Therefore, caution was used in examining the internal validity of the study, and implications for causal relationships were avoided (Creswell, 2009; MacKinnon et al., 2012).

This study was not intended to focus on gamers' prior experiences—such as their self-esteem level—before engaging in gaming behavior. Although I considered including this element during the design of the study, I ultimately rejected it because it would have expanded the scope and length of the study. Moreover, most extant research on online gaming does not account for participants' prior knowledge.

Limitations

There were some inherent limitations in this study that threatened external validity. Gravetter and Wallnanu (2009) stated that when a researcher makes inaccurate inferences and generalizations to the accessible population, it could threaten external validity. Sampling error could not be estimated because I used a convenience sample with volunteer participants. Consequently, the results had weak external validity and were interpreted with caution. Demographic data allowed descriptive comparisons with previously published studies.

Regarding internal validity, correlational studies are limited in that they preclude determination of a cause-and-effect relationship between variables, which makes it impossible to make inferences (Stangor, 2008). In correlational studies the researcher might observe that there is a relationship between the variables that are measured, but that relationship cannot be determined without questions. However, according to Kenny (2014), it is possible to have a reverse causal effect when there is a mediator, which entails that the mediator might be caused by the outcome variable in the study. This is normally referred to as a feedback model. Stangor (2008) also cautioned that because of common causal variables, there could be spurious relationships of which the researcher might be unaware. The internal validity of this study might be weak because I used a convenience sample and correlational design. This resulted in having little control over who participated in the collection of data as survey respondents. Maturation or history was irrelevant to this study (see Gresham, 2014). There may have been some limitations

regarding statistical conclusions. For example, the statistical conclusion validity may have been an issue if the data did not meet the parameters of the statistical tests that were employed.

Construct validity of the variables is discussed in detail in Chapter 3. Construct validity refers to whether the variable is precisely defined and measured by the instruments, procedures, and methods employed in the study (Grimm & Widaman, 2012; Parker, 1993). Another way of thinking about construct validity is that it relates to how well the theoretical concepts in the study are measured by the chosen instrument (Frankfort-Nachmias & Nachmias, 2008). Chapter 3 presents evidence that supports the construct validity of the relationship satisfaction (Hendrick et al., 1995), psychological needs (Gagné, 2003), life satisfaction (Diener et al., 1985), and gaming motivation instruments (Lafreière et al., 2012). However, there was a lack of discriminant validity for the GAMS, given that it is a new measure (Lafreière et al., 2012). Psychometric support for these measures is provided in Chapter 3.

Significance of the Study

The overall goal of this study was to address the gap in the literature about gaming motivation as a mediator between gamers' psychological needs and the outcome variables of gaming behavior, life satisfaction, and relationship satisfaction. As online gaming increases worldwide, it is vital to understand how gaming motivation mediates the relationship between psychological needs and gamers' gaming behavior ("Worldwide Online," 2007), life satisfaction, and relationship satisfaction. Potential benefits included

positive social changes pertaining to the awareness, facts, and problems associated with MMORPGs and virtual reality games regarding their impact on gamers' gaming behavior, life satisfaction, and relationship satisfaction. In addition, the game designers of MMORPGs and virtual realities games may include rest breaks and give the gamers rewards if they take a break (Hussain & Griffiths, 2009b).

Summary

Many different facets of online gaming can be explored in greater detail to ensure a comprehensive review of how psychological needs and gaming motivation affects players. This study addressed some of these facets: psychological needs, gaming behavior, life satisfaction, relationship satisfaction, and gaming motivation. According to Ryan and Deci (2000a), there needs to be more attention focused on how psychological needs and gaming motivation (Lafreière et al., 2012), either physically or psychologically, affect gamers (Charlton & Danforth, 2007; Ryan et al., 2006). Gaming motivation was examined as a possible mediator between psychological needs and the gamers' life satisfaction, gaming behavior, and relationship satisfaction. The study added to the current literature on adult online game players.

This chapter addressed the relationship between the number of hours spent playing online games (virtual or multiplayer role-playing games) and the effect on gamers' psychological needs, gaming behavior, life satisfaction, and relationship satisfaction. This background information was provided in anticipation of the literature

review in Chapter 2 and research methodology in Chapter 3. The theoretical framework was also reviewed in this chapter.

Chapter 2 consists of a review of existing literature spanning decades of research on SDT constructs as they relate to online gaming: the basic needs of online gamers, the motivators involved in online game play, and players' life satisfaction and relationship satisfaction. Chapter 3 provides a detailed description of the methodology of the research design along with the research questions that were used in the study. Chapter 4 presents the study results, and Chapter 5 includes the interpretations of the findings as well as recommendations for future research.

Chapter 2: Literature Review

With the increase in online video gaming ("Worldwide Online," 2007), considerable research has been undertaken to examine the effects of online gaming on such constructs as addiction issues, problematic playing, personality traits, and the psychology of computer usage. Some studies have addressed these constructs in relation to online gaming (Baird, 2010; Chen, Tu, & Wang, 2008; Fang, Lin, & Chuang, 2009; Griffiths, 2010; Young & Whitty, 2010). In addition to the aforementioned constructs, social psychological factors such as psychological needs may influence gamers' gaming motivation as well as affect the outcomes of online gaming associated with gaming behavior and with quality of life. Although there are several extant studies addressing relationship satisfaction, life satisfaction, and gaming behavior defined as frequency and duration of time gamers spend playing (Breuer, Kowert, Festl, & Quandt, 2015; Shieh & Cheng, 2007), there has been little research addressing the relationship between these constructs. Given this research gap, further investigation is needed into the potential role of gaming motivation as a mediator between psychological needs, gaming behavior, and quality-of-life indicators such as life satisfaction and relationship satisfaction. The purpose of this study was to quantitatively examine these relationships using a mediational model.

This literature review begins with a discussion of literature search strategies. I also explore self-determination theory (SDT), which was the theoretical framework for the study. In addition, I discuss online gaming, gaming motivation as a mediator,

psychological and basic needs of online gamers, gamers' relationship satisfaction, gaming behavior, and gaming and life satisfaction.

Literature Search Strategy

Peer-reviewed journal articles and books relevant to the study topic were included in the literature search. Web-based searches were conducted using search engines and scholarly databases such as PsycINFO, ERIC, PsycARTICLES, Google Scholar, PsycEXTRA, Academic Search, PsycBOOKS, Academic Premier, and the Walden Research Center. Key terms used for the search included *Internet*, *online gaming*, *psychological needs*, *life satisfaction*, *virtual reality games*, and *massively multiplayer online role-playing games* (*MMORPGs*). After collecting all of the obtainable peer-reviewed literature on online games with the necessary criteria met, I searched the literature for possible assessment tools for psychological needs, gaming behavior, relationship satisfaction, and life satisfaction that could be used as measures in the study. Search topics also included authors known for their research on self-determination, the Gaming Motivation Scale (GAMS), psychological needs, gaming behavior, relationship satisfaction, and life satisfaction. Given that there was no research on gaming motivation as a mediator of psychological needs, or on gaming behavior, life satisfaction, and relationship satisfaction, I examined the existing studies that addressed how online gaming affects gamers' gaming behavior, relationship satisfaction, and life satisfaction.

Theoretical Framework: Self-Determination Theory

Self-determination theory is a macro theory of human motivation and personality concerning people's inherent growth tendencies and their innate psychological needs of autonomy, competence, and relatedness (Guay et al., 2008). This theory describes the motivation behind the choices that people make in absence of external influences or interference, and also predicts the degree to which people's behavior is self-motivated and self-determined. Self-determination theory has been applied to many areas of human motivation and behavior, including the study of substance abuse and addiction (Sharma & Smith, 2011; Urbanoski & Wild, 2012; Williams, McGregor, & Sharp, (2006); Ryan, & Deci, 2000a); this study examined how SDT applies to online gaming.

Motivation can refer to a situation in which a person is moved either internally or externally to perform a certain action to alleviate a need. Motivation is a major aspect of why gamers play online games. According to SDT, there are two types of motivation: intrinsic and extrinsic. Intrinsic motivation involves performing an activity for the natural satisfaction derived from it. Extrinsic motivation, on the other hand, originates from an external source that has influence over the individual. The figure below presents the details of Ryan and Deci's (2001) model, and the discussion below focuses on the constructs relevant to the proposed research.

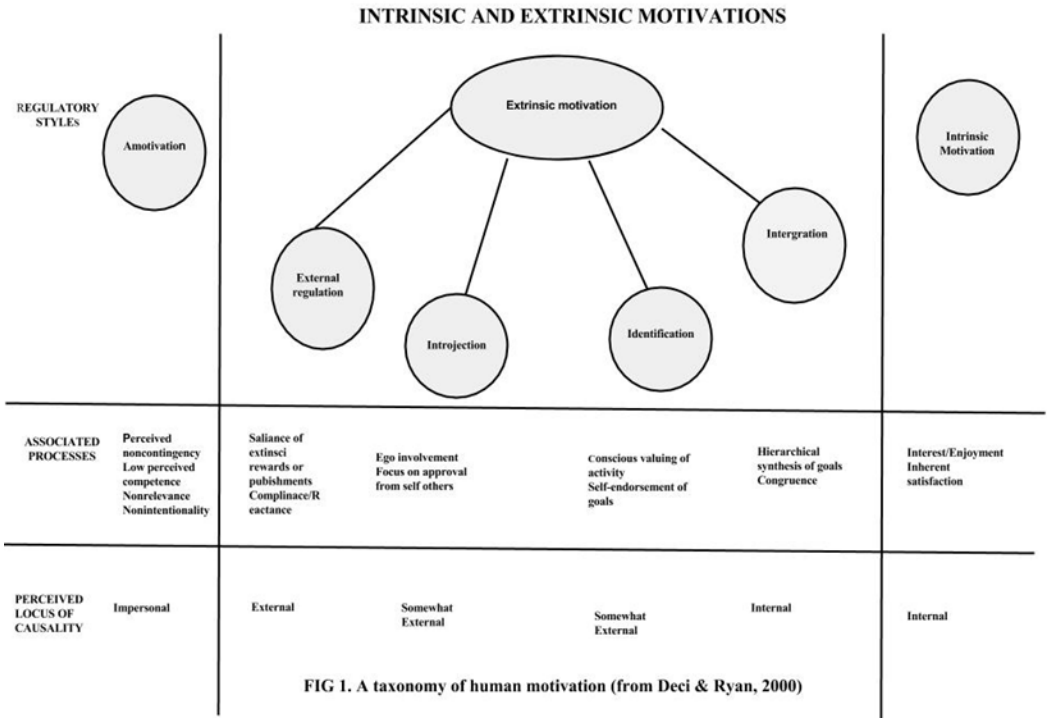

Figure 1. A taxonomy of human motivation (from Deci & Ryan, 2000).

Intrinsic motivation involves performing an activity freely for the natural gratification that one derives from it (Legault, Green-Demers, & Pelletier, 2006; Liu, Lui, & Chi, 2014; Ryan & Deci, 2000a; Wang, Khoo, Liu, & Divaharan, 2008). Legault et al. (2006) explained that intrinsic motivators can determine behavior because an individual is more likely to do something that they find interesting and pleasurable.

Burton, Lydon, D'Alessandro, and Koestner (2006) found that intrinsic self-regulation positively predicted changes in students' psychological well-being and performance. Performing an activity for its own sake and for the pleasure derived from it explains why online gamers continue to play online games even when their basic needs

are not being met (Legault et al., 2006). Yu-Tzu and Lin (2010) demonstrated that the playfulness of a game increases gamers' intrinsic motivation and psychological satisfaction, which consequently increase the amount of time they spend playing that game.

Extrinsic motivation is defined as motivation that is derived from outside stimuli. Most activities that individuals undertake are driven by extrinsic motivation (Bidee et al., 2012). In general, extrinsic motivators have less influence over individuals with stronger autonomy. In contrast, individuals lose autonomy when extrinsic motivators drive their behaviors because other individuals or outside forces are exercising influence over them. Loss of autonomy is linked to negative outcomes such as narcissism, negative affect, and depression, as well as physical symptoms including headaches (Legault et al., 2006). According to Vansteenkiste and Ryan (2013), although extrinsic goals may be appealing, over time these goals may provide only a fleeting sense of satisfaction.

Psychological Needs: Competence, Autonomy, and Relatedness

Self-determination theory emphasizes humans' natural propensity toward positive motivation and states that a person can become dissatisfied or less motivated when he or she is unable to satisfy his or her own basic needs. Human needs (a) help establish an individual's character, (b) provide a basis for assimilating a range of phenomena that might not seem associated at a superficial level, and (c) permit a person to stipulate the relative condition that will enable performance, development, and motivation. Deci and

Ryan (2012) identified three basic psychological needs: relatedness, autonomy, and competence.

Relatedness. Relatedness refers to feelings of being connected and close to significant others. Hutman et al. (2012) described indications of relatedness as being humorous, inviting others to participate, using physical proximity, expressing belonging, defining boundaries, referring to shared experiences, providing physical touch, commenting on the mood in the group, mirroring, sharing personal information, giving positive feedback, helping others, and displaying empathy. Moreover, Stults-Kolehmainen, Gilson, and Abolt (2013) found that teammates felt support, loyalty, and companionship and experienced greater feelings of belonging with their teammates when they had a best friend on their team.

Peng, Lin, Pfeiffer, and Winn (2012) indicated that both face-to-face and over-the-Internet interactions seem to be important in meeting gamers' needs of relatedness. A study of multiplayer online game players showed that a psychological need for relatedness emerges as an important factor that promotes a sense of enjoyment and motivation to play the game (Ryan et al., 2006). Furthermore, Teng et al. (2012) indicated that game designers should encourage interdependence among their players because it leads to gamers' loyalty. When enjoyment and loyalty occur in a relationship, a person's need for relatedness is supported, and intrinsic motivation is enhanced as a result.

Autonomy. Autonomy is the ability and freedom of an individual to make decisions and act independently of others. According to Hodgins, Brown, and Craver (2007), all human beings have autonomy to a certain degree, but the strength of individuals' autonomous orientations differs. Autonomy is associated with a person's self-esteem—a critical factor in a person's ability to handle life issues and emotions (Hodgins et al., 2007). Moreover, autonomy helps to reduce misrepresentations and biases (Hodgins et al., 2007).

Deci and Ryan (2012) found that social contextual factors that thwart an individual's satisfaction of basic needs, such as health or economic issues, diminish a person's autonomy, performance, and well-being. Matthews, Brookes, Stones, and Hossain (2005) found that for some Muslim women, negative health conditions such as HIV/AIDS or cardiovascular disease could affect their mental health and diminish their autonomy, negatively affecting their well-being. Patrick and Williams (2012) stated that autonomous self-regulation of a person's perceived behaviors such as eating or smoking can affect one's actual behaviors and health outcomes. Jolly et al. (2009) stated that an individual who has less autonomy than someone else is more likely to engage in an activity that is controlled by someone else. Moreover, individuals with less autonomy are more likely to suffer from depressive symptoms (Jolly et al., 2009).

Social context that deals with how an individual perceives an environment is just as important as the environment itself (Deci & Ryan, 1985). A *social contract* is an unwritten agreement that is said to exist among certain members of a group or

community that helps guide individual behavior and established responsibilities and rights (Business Dictionary, 2015). *Social environment*, on the other hand, encompasses a person's immediate social relationships, physical surroundings, and cultural settings (Barnett & Casper, 2001). Grouzet, Valleranad, Thill, and Provencher (2004) examined the effect of environmental factors on a person's autonomy. Participants' environmental factors were experimentally manipulated, and Grouzet et al. found that a person's perceptions of autonomy could affect his or her performance. Moreover, a person's social contexts correspond with how successfully he or she interacts with his or her social environment (Çankaya, 2009; Faye & Sharpe, 2008).

When activities are performed out of self-interest or personal value, a person's perceived autonomy is high (Hodgins et al., 2007). According to Benita, Roth, and Deci (2013), there is considerable research indicating that autonomous regulation tends to be associated with creativity, effective problem solving, better psychological health, and flexibility of thought. However, if a person's sense of autonomy diminishes, his or her motivation will also decline (Ryan et al., 2006). Roth (2008) found that people with low autonomy experience negative psychological consequences such as lower psychological well-being and more maladaptive behaviors.

In the context of online gaming, gamers have the opportunity to choose what types of games to play and how long to play those games. Autonomy support is a behavior that an individual may exhibit that holds implications for the formation of self-determined regulations (Rouse, Ntoumanis, Duda, Jolly, & Willimas, 2011). Kipp and

Weiss (2012) suggested that within a team setting, the mastery of a person's climate and the quality of his or her friendships with teammates is associated with his or her well-being. A supportive social environment will foster and satisfy a person's intrinsic values by supporting his or her psychological needs (Miesen, 2009; Williams, Grow, Freedman, Ryan, & Deci, 1996).

Ryan et al. (2006) found that players who experienced higher levels of autonomy while playing a game (e.g., those who are the team leaders or make decisions by themselves during the game) had a more positive experience than players who were not allowed much autonomy. Shaski et al. (2010) found that the need for satisfaction of autonomy in video games resulted in positive outcomes, and autonomy resulted in increased enjoyment and a desire for future play. Furthermore, game design can help fulfill gamers' need for autonomy if designers take into account gamers' need for autonomy (Ryan et al., 2006).

Competence. The third human need in SDT is competence. Ryan et al. (2006) proposed that factors that enhance competence, such as acquiring new skills or abilities, being optimally challenged, or receiving positive feedback, enhance a person's perceived competence, which in turn enhances his or her intrinsic motivation. Vansteenkiste and Ryan (2013) asserted that when an individual performs an activity out of curiosity, that person is more likely to experience a sense of astonishment, which forms the impetus for quick absorption of new material and skill. Grouzet et al. (2004) explained that a person's

competence is a mediator of the relationship between his or her objective performance feedback and situational motivations.

In addition, Miserandino (1996) explained that his or her social context can improve or diminish one's competence. Competence can promote realistic expectations and consequences, but it can be blocked or diminished by inconsistency, chaos, intimidation, or neglect (Miserandino, 1996; Skinner & Wellborn, 1994). Consequently, if a person is not progressing toward a goal as anticipated because of the social context, that person may begin to feel helpless or forsaken (Abramson, Metalsky, & Alloy, 1989). In contrast, if a person feels optimism or progress toward one's goals, which may be enhanced by one's social context, it can improve his or her psychological well-being and health (Carver and Scheier, 1990).

Competence in a gaming context involves players' needs to be challenged and to be effective at meeting the challenges associated with the game (Ryan et al., 2006). Players may fulfill their needs for satisfaction and competence by learning new skills, by wielding effective hardware and software control, and by feeling challenged by increasing levels of difficulty as the game progresses (Peng et al., 2012). Competence is enhanced when clear, dependable, and sensible expectations and structures are provided. Players strive to improve their playing level to satisfy their need to be competent. As such, feelings of mastery are primary motivators for gamers (Freddolino & Blaschke, 2008). Gamers seek power by making friends with fellow players and dominating them. This feeling of mastery, in essence, allows players to accomplish feats they consider to be

unattainable in the real world. This feeling is a powerful attraction for players to continue to play (Freddolino & Blaschke, 2008).

Another key factor for game players is the heightened sense of arousal that they derive from game characteristics, such as the lack of boundaries, challenges, and real-time interaction, which increases gamers' competence (Wan & Chiou, 2006). However, if gamers lack social competence, it can affect their well-being because they can become depressed.

In sum, SDT theorizes that individuals need competence, relatedness, and autonomy as internal motivational factors to achieve optimal development and overall well-being (Ryan & Deci, 2000).

Relationship of SDT to Well-Being

Self-determination theory has been used to study an immense number of outcomes of the human experience, including academic, work, and athletic performance; physical health; mental illness; family systems; and team building and leadership. However, the research using SDT as the model to examine how people make choices to maximize well-being is relevant to this study.

Deci and Ryan (2001) proposed that when autonomous, people optimize conditions to improve the quality of their lives (Patrick, Knee, Canevello, & Lonsbary, 2007; Reis, Sheldon, Gable, Roscoe, & Ryan, 2000). When an individual engages in activities performed for autonomous reasons; these activities consistently lead to psychological well-being according to studies (Sheldon, Ryan, Deci, & Kasser, 2004;

Sheldon & Elliott, 1999). Most recently, a meta-analysis of 184 SDT-based studies in the health domain indicated that autonomy of patients and environmental autonomy support predicted greater satisfaction, better mental health, and higher levels of positive health behaviors (Ng et al., 2012).

Gaming Motivation Scale (GAMS)

The GAMS was developed to measure aspects of SDT's motivation theory that are specific to the theorized motivational factors in online gaming. The GAMS is composed of six motivation factors—intrinsic motivation, integrated regulation, identified regulation, introjected regulation, external regulation, and amotivation (Lafreière et al., 2012)—which, with the exception of amotivation, have already been discussed in detail in the previous sections. This study involved gaming motivation by using GAMS scores.

Amotivation can be defined as lacking an intention to act (Deci & Ryan, 2008), meaning that one lacks both intrinsic and extrinsic motivation (Lafreière, Verner-Filion, & Vallerand, 2012). Amotivation occurs when individuals perceive negative feedback that will decrease their perceived competence and undermine their extrinsic or intrinsic motivation (Gagné & Deci, 2005). Amotivated person lacks a sense of personal causation (Deci & Ryan, 2000), resulting in the individual not valuing the activity that he or she is performing, not feeling competent in the activity, or not believing that the activity will produce a sought outcome (Gagné & Deci, 2005). Amotivation is similar to learned helplessness (Tavakkoli et al., n.d.).

Online Gaming

Online gaming is a communication medium used throughout the world that occurs on desktop computers, laptops, tablets, smartphones, mp3 players, and video game consoles, as well as in homes, workplaces, schools, Internet cafés, and video arcades. According to Freddolina and Blaschke (2008), online gaming started in the late 1970s and has continuously evolved since then. *Multi-User Dungeon* (*MUD*) was the first text-based multiplayer game created (Freddolina & Blaschke, 2008). It was introduced in 1979 and became commercially available in 1984 (Freddolina & Blaschke, 2008). The introduction of MMORPGs did not occur until the late 1980s and early 1990s. According to Mulligan (1999), around four to five million homes had online service at that time. Online service paved the way for future online games. By 2006, there were more than 100 million individuals playing MMORPGs and virtual world games such as *Second Life* (Reynolds, 2006). In 2007, worldwide online gaming had reached 217 million individuals, with an approximate user growth rate of 17% in one year ("Worldwide Online," 2007).

Mobile gaming on smartphones, electronic tablets, and iPod Touch media players is also on the rise. By 2011, mobile gaming had increased by 13%, resulting in more than 130 million hours of play per day with 9% of that money being spent on games, which have a gross monetary value of $5.8 billion ("Mobile Games," 2012). The two main forms of online games are virtual reality games and MMORPGs. Many of these games, such as *Age of Conan*; *Warhammer*; *Requiem*; and *Bloodymare*, have become more adult

oriented and contain extreme violence. Some online games, such as *Sociolotron*, also allow gamers to explore consensual and nonconsensual sex during virtual game play. Certain gamers use such games as an excuse to virtually perform sexual acts that are considered offensive or unacceptable by society, claiming that these acts are acceptable because they are imaginary and not reality based (Downing, 2010).

Virtual reality games are defined as places or worlds that encompass real-world outcomes without possessing a physical form (Noor & Lobeck, 2009). This definition implies that gamers can interact with imaginary worlds and environments while still remaining in the real world physically. Virtual worlds are not physical, but they do have a measurable impact on the real world because they physically and mentally affect the gamers who are playing. Virtual worlds are limited by the gamers' imaginations, by how they are designed and purposed, and by how they function. The inhabitants who exist in these virtual reality games are called residents. Who can manipulate their state; for example, the resident can change what happens in the game or the setting of the game (Denault & Kienzle, 2011).

Online gamers use virtual representations of themselves to interact with one another. These representative identities or entities are called avatars. These residents o explore their virtual worlds by socializing, creating and trading virtual property, partaking in individual and group activities, building homes and other objects, attending virtual classes, and using online services (Coyne et al., 2009; Denault & Kienzle, 2011; Noor & Lobeck, 2009). For example, the game *Eve* has extensive monetary factors in

which players who are 16 years old or older can earn a profit while playing some virtual games by building virtual stores and selling items to other gamers (Kenny & Gunter, 2008). It is possible for relationships to form among players in these virtual worlds (Hsu, Ju, Yen, & Chang, 2007).

Massively multiplayer online role-playing games are a major type of virtual reality game, and they are also persistent worlds. A *persistent world* is defined as a world that continues even when the gamer is not playing the game and in which the changes that users make to their virtual worlds are to some extent permanent ("How Persistent," 2009). The concept of persistent worlds is used in multiplayer online video games. According to Yee (2006), the worlds of MMORPGs can hold up to 2,000 gamers concurrently, and every gamer is motivated by something different, such as rewards or inclusion in social networks. Within the game environment, a social network can consist of ideological alliances, guilds, or combat groups, depending on the desires of the gamers.

When gamers are playing virtually together on two- or four-player game consoles such as Xbox, few real-world social interactions exist between online game players outside of the game (Cole & Griffiths, 2007). Massively multiplayer online role-playing games are played on a computer and can be played by only one player at a time, which can lead to little social interaction with people in the real world (Cole & Griffiths, 2007). *World of Warcraft* is a popular MMORPG that offers gamers up to 70 different levels of play and allows gamers to work cooperatively with each other to create teams. Players

can use multiple avatars, allowing them to play in multiple contexts (Kenny & Gunter, 2008).

Gamers come from a wide range of demographics and backgrounds. Research indicates that there are negative aspects to these games that have not been reported in studies such as the one performed by Kenny and Gunter in 2008; a primary aspect is the possibility of some gamers developing compulsions to play these MMORPGs. This compulsion to play can cause sleep deprivation, social isolation, and poor health (Kenny & Gunter, 2008; Wei, Chen, Huang, & Bai, 2012).

Yee (2006) conducted a study that identified four factors that enable individuals to interact socially in an online gaming environment. The first factor is greater online anonymity. We and Ming (2010) specified that the anonymity of the Internet appeals to shy individuals because it can supply social interactions that they might not be able to engage in otherwise. This situation could lead to psychological dependency on the Internet and activities that occur via cyberspace. The second factor involves users' physical appearance being significantly reduced or altered, and real-world visual cues are unable to be expressed this in online environment. Players are therefore unable to influence each other's behavior by employing such cues. The third factor involves the Internet transcending issues of physical space and distances between individuals who are interacting. The fourth factor allows gamers to interact with people all over the world.

Young and Whitty (2010) examined how relationships (social interactions) in the real world are considered to be more certain, but in cyberspace (online gaming) the

possibility exists for altered contingencies that are more immediate and far reaching than those found offline. Gamers can escape to a different reality and time without ever leaving their homes. As a result, social interactions that occur during online gaming can result in deindividuation. For example, a user may experience a decreased sense of self-awareness, which can occur separately or coincidentally with other individuals (Meyrowitz, 1986). Deindividuation can produce several outcomes, such as a reduction in the individual's aptitude for participating in logical long-term planning and a weakening of the individual's ability to regulate his or her behavior (Meyrowitz, 1986; Wei et al., 2012). Thus, online gaming can have both positive and negative effects.

Because of easy accessibility to the Internet, more individuals are participating in online gaming (McKenna & Bagrh, 2000). In a study by Hussain and Griffiths (2009b) of 119 online gamers, two thirds of the gamers stated that they suffered negative affect from online gaming. The gamers liked that they were more social online, but they were more antisocial in the real world, which many disliked.

Characteristics of the Players

Gamers range from young children to adults from all types of backgrounds, ethnicities, and countries (Kenny & Gunter, 2008; Yee, 2006). Freddolino and Blaschke (2008) asserted that gamers fit into the following eight categories: (a) newcomers, (b) time killers, (c) stress relievers, (d) social players, (e) enthusiasts, (f) professionals, (g) devotees, and (h) addicts. A newcomer is inexperienced and naive about particular gaming mechanics and etiquette. Time killers play because they have free time and with

the intention of altering their sense of time because time seems to move at a faster pace during games. Stress relievers play to release stress from their daily life. Enthusiasts are excited to play the game. Professionals have deeply studied the game to master it, and they usually play in competitions. Devotees are loyal fans of the game who play regularly. Addicts are players who play excessively or compulsively and whose playing interferes with their daily lives.

Individuals who fall into the first four categories are considered casual players, whereas the players who fall into the last four categories are considered hardcore gamers, meaning that they are obsessed with gaming and are prone to playing too much. In an effort to regulate such intense gaming, the Chinese government has stated that 3 hours is the maximum length of time that one should engage in computer gaming each day and has passed laws regarding the number of hours that users are allowed to play (Achab et al., 2011).

Gaming behavior involves the frequency and duration of time that gamers spend playing online games such as virtual reality games or MMORPGs in this study. According to past research (Hussain & Griffiths, 2009a; Kowert et al., 2014; Van Rooij, Schoenmakres, Vermulst, van den Eijnden, & van de Mheen, 2010; Shieh & Cheng, 2007; Suárez, Thio, & Singh, 2012), gaming behavior is generally defined as the frequency and duration of time spent playing per week.

Gaming behavior has been shown to affect gamers' mental health and well-being in several different ways. Smyth's (2007) results provided evidence that when gamers

engage in excessive game play, some negative consequences occur, such as decreased sleep quality and other health issues. In addition, some studies (Kowert et al., 2014; Lo, Wang, & Fang, 2005) have found that spending a greater amount of time playing online is one factor that predicts problematic game play. Kuss et al. (2012) also found a significant association between problematic video game playing and the weekly hours spent gaming. Moreover, Lo et al.'s (2005) study indicated that the longer that online gamers play, lowering their expectations to sustain satisfying relationships. In addition, Huang (2006) found that gamers who spent more than 10 hours gaming per week showed signs of weaker intimacy development and identity achievement as well as increased isolation and identify diffusion.

Psychological and Basic Needs of Online Gamers

As described earlier in the discussion of SDT, satisfaction of an individual's psychological and basic needs normally results in a healthy attitude and satisfaction with life, whereas the thwarting of a person's personal needs can lead to maladjustment and unhappiness (Ryan & Deci, 2000). Maslow (1970) and Ryan and Deci (2000b) proposed that there are universal human needs, and the fulfillment of these universal human needs is likely to enhance a person's well-being. Basic needs (e.g., air, food, shelter, sex, and drink) and basic psychological needs (e.g., autonomy, relatedness, and competence) influence human development (Maslow). Therefore, the fulfillment of these needs should lead an individual to feel satisfied. Ryan et al. (2006) found that gamers attempt to satisfy some of their psychological needs through online games and that their skill levels can

affect their psychological well-being. For instance, if players' skills are greater than the challenge of the game, they easily become bored; if their skill levels are weak and the challenges are too difficult, they might feel anxious (Ryan et al., 2006; Wan & Chiou, 2006). When there is balance between skill level and challenge level, the gamers' motivation will increase while playing.

Benefits of Online Gaming

There are many documented benefits of online gaming. Gross (2009) indicated that adolescents may benefit from online gaming by seeking peers who are friends as well as others who are unknown to them, which helps improve their mood and sense of belonging and thereby reduces feelings of isolation. An additional positive consequence of gaming is that it offers a variety of ways to connect to other players (Griffiths, 2010). Gaming platforms are integrated with broad social networks, such as Facebook, allowing for more social interaction (Mulligan, 1999). Some gamers may feel as if they have power over their surroundings and the game; hence, they achieve the psychological benefits of relatedness and competence through online game playing (Ryan et al., 2006).

Furthermore, online gaming may offer some therapeutic value because of the immersive and dissociative experiences that gamers undergo during the game, which enable them to cope more effectively with the stress and the strain of everyday life (Griffiths, 2010). Dissociative experiences may allow some gamers to separate themselves from their daily lives and routines for a short period, but for others these experiences could be a sign of mental illness, which would be a negative consequence

(Suler, 2004). Immersion occurs when images and senses take people to an altered mental state, which allows gamers a way to escape from everyday life (Griffiths, 2010). Online gamers whose motivation is immersion choose role-playing games, take time to discover the story behind the game, enjoy decorating their avatars, and use online gaming to escape from real-world problems and interactions (Suárez et al., 2012). Immersion allows players to role-play, discover more about themselves, and temporarily set aside their real-world conditions and concerns.

Another benefit of online gaming is that it allows for anonymity, which has both positive and negative consequences. Anonymity allows players to have great flexibility in identity construction. It allows some individuals who feel that some aspects of their identities are constrained in the real world to experience a greater sense of autonomy and self-worth (Meyrowitz, 1986). Consequently, gender swapping is a common occurrence while playing anonymously in online simulated environments (Suler, 2004). Gender swapping allows players to try out other parts of their personalities, which would be challenging to do offline. For some individuals, this gender swapping can be beneficial to their psychological well-being (Griffiths, 2010). People's psychological and basic needs—including the need to express their identity—must be satisfied for them to cultivate a healthy mental state and function successfully as members of society. If people's needs are not satisfied, social functioning and well-being may be compromised (Ryan et al., 2006). In an effort to further explore how gaming may compromise such

human needs; this study included the negative consequences of online gaming for gamers' gaming behavior, life satisfaction, and relationship satisfaction.

Negative Consequences of Online Gaming

Studies have shown that some gamers experience negative consequences from playing games online, such as increased overall health issues, violent inclination, addiction, worsened sleep, lowered physical well-being, lowered achievement levels, and lowered psychological well-being (Ryan et al., 2006; Smyth, 2007). A negative consequence of anonymity can be a decompartmentalization of self, meaning that various aspects of self are not well integrated, which can lead to unrealistic behaviors, multiple personalities, and delusion (Chen, Tu, & Wang, 2008; Meyrowitz, 1986; We & Ming, 2010).

Additionally, players may act as though they are completely immersed in the group. Chen et al., (2008) found that students who played in anonymous conditions reported significantly higher levels of motivation and satisfaction compared to those who engaged in face-to-face conditions. Online gaming is also linked to addiction and often leads to depression; a study by van Rooji, Schoenmakers, Vermulst, van den Eijnden, and van de Mheen (2010) indicated that addicted gamers were more depressed than nonaddicted gamers.

Many gamers do not perceive virtual reality games like *Second Life* as games because they have the freedom to create their own avatars (online personas) and gain wealth. Some players experience maladaptive cognition about themselves and about the

world around them because they favor their online self over their real self (Davis, 2001). A survey conducted of 532 gamers indicated that 20% of young adults and teenagers believed that they actually possessed some of the abilities and skills displayed by their avatars or characters in the games (Young & Whitty, 2010). Another issue related to online gaming is gamers' relationship satisfaction, which is discussed below.

Gamers' Relationship Satisfaction

In general, relationship research focuses on personalities, situations, processes, or interactions that affect relationships and how they influence relational functioning. Worldwide, 36% of gamers are married, and 22% of them have children (Entertainment Software Association, 2009; Yee, 2006). The Entertainment Software Association (2009) reported that almost 68% of households play video games, and at least one third of those gamers are married. Given that a large number of gamers are married or in a relationship, it is important for couples, family members, friends, employers, and therapists to understand how online gaming affects relationships (Hertlein & Hawkins, 2012). A study by Miller, Das, and Chakravarthy (2011) indicated that individuals who live in a collective culture have a strong social expectation of others who are considered in-group members. For example, when individuals have normative responsibilities to be responsive to the needs of their family and friends, these individuals experience a sense of agency involving choice to meet their expectations (Miller, Das, & Chakravarthy, 2011). Online gaming may affect gamers' relationships, especially if they are experiencing conflict with family or friends. According to Beranuy, Carbonell, and

Griffiths (2013), escapism appears to be a primary reason that many online gamers play; it is usually associated with interpersonal and intrapersonal conflict. Gamers' relationships are affected by their intimacy levels and other needs, which are discussed in the following sections.

Intimacy and Other Needs

Intimacy is a major component of relationship satisfaction. *Intimacy* occurs when a person's need for satisfaction is influenced by emotional experiences. Ryan and Deci (2000) stated that when an individual has a partner who is supportive of that person's needs, this partner actively attempts to understand one's interests, preferences, and perspectives, which creates an environment for being independent. Moreover, when people feel that they belong in a relationship or community, they have confidence in themselves and their needs are supported; therefore, optimal functioning occurs more easily.

Gaming can impair this functioning. Gamers' optimal functions are hindered when their relational partner is controlling, has unrealistic expectations, and exhibits rejection (La Guardia & Patrick, 2008; Ryan & Deci, 2000). Furthermore, when a partner in a relationship does not feel exclusive or special because his or her partner has a relationship online, this situation may undermine the real-world relationship (Hawkins & Hertlein, 2013). One in five participants in a 2007 study by Cole and Griffiths believed that playing MMORPGs had a negative effect on their relationships with nongamers.

Some gamers seek to establish relationships with other gamers online, an issue which is examined in the following section.

Seeking Relationships via Gaming Through the Internet

Online gamers have been known to try to satisfy their unmet real-life social needs by seeking relationships online (McKenna & Bargh, 2000). As humans develop into adolescents, their friends and romantic partners become important figures in their lives. Experiencing fulfillment in these essential relationships is crucial to their welfare and interpersonal development. Online relationships are another form of relationships that certain individuals seek. Some research has indicated that individuals can reduce the risk of depression by developing social relationships through Internet communication (McKenna & Bargh, 2000). Scott, Monttarella, and Lavooy (2006) found that people who pursued relationships that were online reported lower intimacy in their online relationships than in their offline romantic relationships; however, those who had no online relationships had higher levels of intimacy in their offline relationships than those who also had online relationships. Even though gamers might form relationships online, these relationships may not satisfy real-world social needs (Peris et al., 2002).

Individuals who interact with others online and believe that those relationships are strong may have real-world relationships that suffer. A report by the American College Health Association (2005) stated that online gamers tend to live in virtual space; if they identify with their online characters and lifestyles in cyberspace realms, they may ignore their real-world friends and eventually drift away from them. Online gamers approach

deteriorated and broken relationships in a different manner from that of nongamers, often pushing issues aside or ignoring them completely and logging in to games with a new name and identity to avoid confrontation (Lo et al., 2005). Although depression, loneliness, and negative self-esteem might decrease for some gamers who find refuge in online games and the relationships that they establish there, these conditions might increase for many gamers who rely exclusively on online relationships and thus fail to support social contacts and their own needs in the real world (Van Rooij et al., 2010).

Gaming Behavior and Relationships

Considerable research has been done to examine how gaming behavior affects gamers' relationships. For example, Hertlein and Hawkins (2012) conducted a hermeneutic study of 18 published articles about couple relationships and gaming. They identified five themes that summarize the challenges identified in these studies: fantasizing, intimacy disruptions, addiction, inclusion or exclusion, and flexibility or rigidity. Young's (2009) research showed that adolescents who engaged in problematic online gaming suffered from weak real-life interactions with family and friends. Moreover, Lo and Wang (2005) found that college-aged online players' relationship satisfaction decreased as the quantity of time spent online increased. However, the body of research does not included the study of how life satisfaction and gaming motivation influence the impact of gaming behavior on relationship satisfaction, and I hoped to contribute to filling this research gap.

Gaming and Life Satisfaction

Life satisfaction refers to people's attitudes, feelings, and cognitive awareness about themselves at a specific point in life (Drobnič, Beham, & Präg, 2010). Research (Gonzalez-Herero & Garcia-Martin, 2012; Lightsey, Maxwell, Nash, Rarey, and McKinney, 2011) has indicated that an individual's self-esteem and optimism have a positive effect on the individual and are significantly associated with increased life satisfaction. Life satisfaction constitutes to one of the core dimensions of hedonic well-being (Ryan & Deci, 2001).

Furthermore, life satisfaction can indicate a person's own unhappiness (Proctor, Maltby, & Linley, 2011) and is unrelated to that person's age and gender (Lightsey et al., 2011). Life satisfaction also predicts important health-related outcomes. For example, lower life satisfaction predicts mortality and higher suicide rates (Lightsey et al., 2011). Chen et al. (2008) concluded that inner happiness, or life satisfaction, is derived from leisurely pursuits such as online gaming or golfing, not from an individual's health, economic situation, type of employment, or family. Research by Drobnič et al. (2010), in contrast, showed that work, family life, and academics help to determine a person's life satisfaction.

González-Herero and García-Martín (2012) indicated that the life-satisfaction level of middle-aged people can be predicted by the community services and social activities in which they participate, such as online gaming. These researchers examined housewives' life satisfaction and found that it was positive when the women participated

in social activities. In contrast, mass communication, such as emails, showed negative association.

The relationship between life satisfaction and Internet usage is complex; in addition, Internet usage can serve to contribute to or diminish life satisfaction. For example, Huang (2010) used a fixed-effect model to examine psychological well-being. The first position claimed that the Internet offers social interaction for users and improves their life satisfaction. The second position argued that Internet usage damages a person's mental well-being because of the lost time spent with friends and family. The study indicated that the Internet actually weakens families and communities, which can negatively affect gamers' life satisfaction (Huang, 2010). Other research has shown that compulsive Internet use (e.g., more hours spent online) has a negative effect on life satisfaction (Meekerk et al., 2010).

In South Korea, online games have become a public health concern that affects overall life satisfaction because many high-school students spend 23 hours per week playing online (Kwon et al., 2011). Some have died because of cardiopulmonary issues such as heart attacks from excessive game playing, committed suicide, or committed murder because of difficulties in distinguishing between games and reality (Kwon et al., 2011). Gamers' physical health can also be affected by a loss of sleep (Liu & Peng, 2009; Wei et al., 2012). Other physical health issues include repetitive stress injuries, carpal tunnel syndrome, eyestrain, forgoing food, fatigue, and physical pain (Wei et al., 2012, Young, & Zakalik, 2005, 2012, 2010; Young, 2009).

Excessive playing of MMORPGs has been shown to lead to players' having worsened health, sleep quality, and academic performance, and having difficulty socializing in the real world (Smyth, 2007). Mental health issues such as depression, loneliness, anxiety, violence, and suicidal ideation can also arise from online gaming (Baird, 2010; Davis, 2001; Freddolino & Blaschke, 2008). In addition, time loss in the real world results in how swift time goes by when playing video games (Hussain & Griffiths, 2009a).

Summary

Millions of people play MMORPGs and virtual reality games for amusement; many spend copious amounts of time each day forming relationships with other online game players and view these online relationships similar to their offline relationships. The literature provides support demonstrating that gaming has an effect on quality of life for gamers and their social relationships, but this relationship is complex and subject to influence by many still unexplored individual differences. This study seek to add to the body of knowledge by examining a mediational model of how psychological needs influence gaming behavior, relationship satisfaction, and life satisfaction in online gamers. The research methodology for this study as well as the scales that were employed and the data analysis process is discussed in Chapter 3.

Chapter 3: Research Method

The purpose of this quantitative study was to examine how gaming motivation mediates the relationship between psychological needs and gaming behavior, life satisfaction, and relationship satisfaction in MMORPG and virtual game players. This chapter includes the research design, sampling criteria, instrumentation, and procedures for collecting and analyzing data. I also review the threats to internal, external, construct, and statistical conclusion validity and describe the measures taken to ensure the ethical protection of participants.

Research Design and Approach

I chose a nonexperimental survey design over a true experimental design because of the constructs and in ability to assign participants to conditions. The intent was to examine possible correlations between the variables, which were self-reported measures of real-life situations, attitudes, and beliefs (see Gravetter & Wallnau, 2009; Kenny, 2014). The nonexperimental design was chosen primarily because the independent variables could not be manipulated.

Online survey designs are generally faster, cheaper, and more flexible than other methods, and they allow the researcher to collect a large amount of data in a short time. The primary disadvantages are that (a) the researcher has no control over participant selection (participants volunteer), (b) the researcher has no control over the data collection setting, and (c) participants can intentionally or unintentionally distort their answers, reducing measurement validity (Stangor, 2008). I examined how gaming

motivation mediates the relationship between psychological needs and gaming behavior and two measures of quality of life (life satisfaction and relationship satisfaction) in MMORPG players. For the independent variable, the psychological needs construct was measured using the Basic Needs Satisfaction in General Scale (Gagne, 2003). The dependent variables were gaming behavior, life satisfaction, and relationship satisfaction. The mediating construct was gaming motivation, measured using the Gaming Motivation Scale (Lafreniere et al., 2012). All these measures consisted of Likert-scale items that were summed to create interval scales appropriate to correlational analyses. The psychometric properties are presented later in this chapter. Walden University's approval number for this study is # 02-11-16-0014294.

The three research questions their respective models were as follows:

RQ1: Does gaming motivation mediate the relationship between psychological needs and gaming behavior?

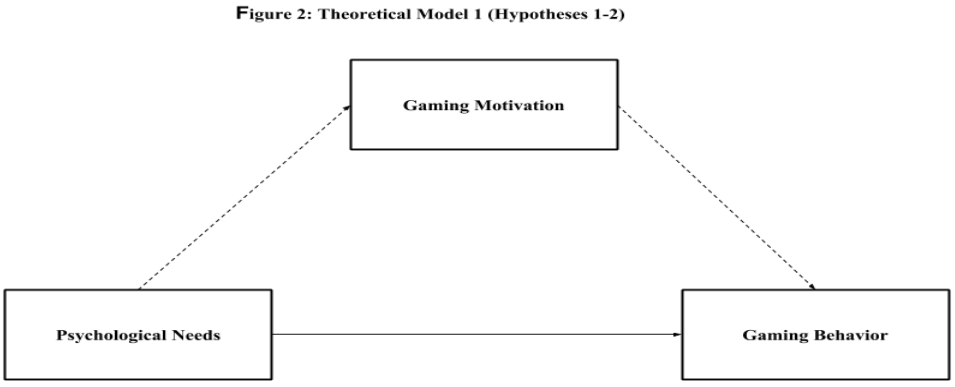

Figure 2. Theoretical Model 1 (Hypothesis 1-2)

RQ2: Does gaming motivation mediate the relationship between psychological needs and life satisfaction?

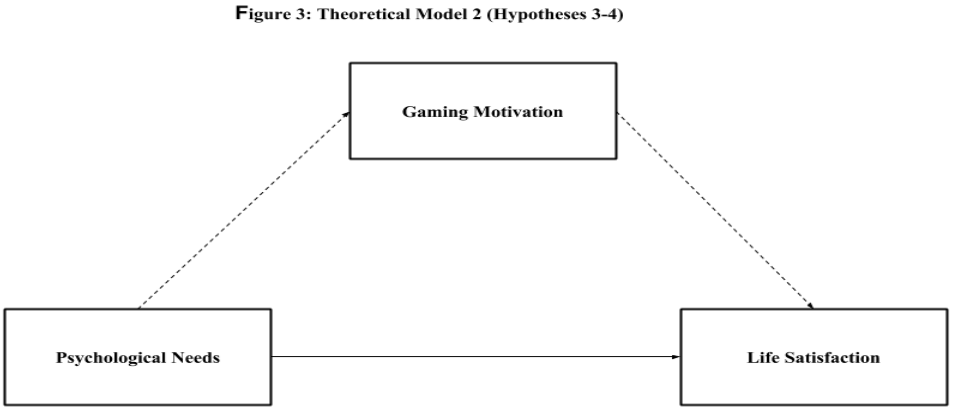

Figure 3. Theoretical Model 2 (Hypotheses 3-4)

RQ3: Does gaming motivation mediate the relationship between psychological needs and relationship satisfaction?

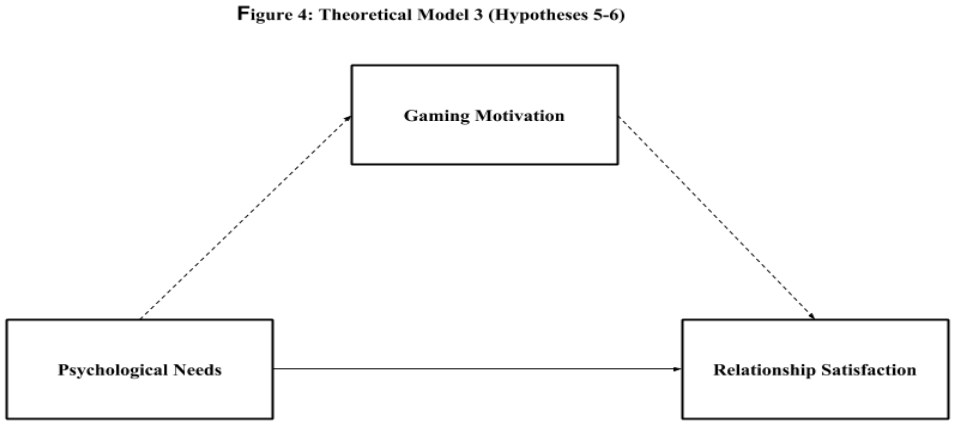

Figure 4. Theoretical Model 3 (Hypotheses 5-6)

Population

The target population of this study was online video gamers who played either MMORPGs or virtual reality games. The accessible population was gamers who visit listservs such as Stratics and IGN Vault Networks that have subsites for different MMORPGs and virtual reality games. Invitations with a link to the survey site were posted on these online forums, and a Facebook page was created that contained a link to the study.

Sampling and Sampling Procedures

I invited all participants from the listservs, Walden participation pool, and Facebook page who met the criteria for participation. The participants volunteered, which meant that they were self-selected to participate in the study. There were four inclusion

criteria for the participants in this study: at least 18 years of age, able to read and understand English, currently in or have been in a romantic relationship for at least 1 year and currently playing either MMORPGs or online virtual reality games. Individuals who met the criteria were invited to participate in the study.

A convenience sampling is not representative of the population that plays online games because (a) not all online game players participate in listservs and (b) the researcher has no influence on the selection of participants. This is a disadvantage of using this type of sampling method (Trochim, 2006). I used G*Power 3.1.9.2 (Faul, 2014) to estimate the sample size. Using a linear multiple regression model for R^2 increase, a moderate effect size = .10, $\alpha = .05$, $\beta = .80$, and four total predictors (three psychological needs scales and one overall gaming motivation scale), I calculated a sample size of 125. I strove to have this minimum number of participants and achieve a power level of at least .8.

Procedures for Recruitment, Participation, and Data Collection

The participants for this study were recruited from the Walden participation pool, Facebook, and listservs such as Stratics and IGN Vault Networks that have subsites for different MMORPGs and virtual reality games. An invitation to participate was posted on these online forums, and a Facebook page was created that contained a link to the study (Appendix A). The link took the participant to the SurveyMonkey website. Participation was strictly voluntary.

The first thing that participants saw when accessing the online survey was the informed consent form. Once participants had read the consent form and felt that they understood the study well enough to make a decision about their involvement, they clicked a box indicating that "I understand and consent to participate in the study" before being able to access the survey. The questionnaires were presented in the order described in this document, with a page break between each questionnaire. When participants completed the questionnaires, a final page appeared to thank participants for their time and to provide a phone number and email address if they had questions about the study or wanted to receive a summary of the results.

Materials and Instrumentation

The inventories that were used in this study included the Basic Needs Satisfaction in General Scale (Gagné, 2003), the Gaming Motivation Scale (Lafreniére et al., 2012), the Satisfaction with Life Scale (Diener et al., 1985), the Relationship Assessment Scale (Hendrick et al., 1988), and a short demographic questionnaire, which included questions about gaming behavior and the inclusion criteria. Copies of these instruments are included in Appendices D, E, F, and G. These four inventories are considered public domain psychological instruments and can be used for educational and research purposes without asking the authors directly for permission. Completing all four questionnaires and the demographic items was anticipated to take no more than 20 minutes.

Demographics

Demographic information collected for the study (see Appendix C) included gender, age, and ethnicity. This information was collected to describe the sample. Relationship status was included to determine whether the participants met the criteria. After reviewing the definition of MMORPGs and online virtual reality games, participants were asked to classify themselves as either MMORPG or virtual reality players and then to move on to the questionnaire items.

Gaming Motivation Scale (GAMS)

The GAMS (2012) is a fairly new assessment for measuring gaming motivation and was developed to assess gaming motivation. Gaming motivation can be defined as how motivated or unmotivated a player is to play a game. The GAMS is based on the SDT framework and has six subscales: intrinsic motivation, integrated regulation, identified regulation, introjected regulation, external regulation, and amotivation. The GAMS was derived from 24 items, and each subscale started with four items each. Confirmatory factory analysis was conducted, and six cross-loading items—one from each subscale—were identified and then removed, resulting in six 3-item subscales, leaving 18 items total, or three for each subscale (Tavakkoli et al., n.d). The 18 items that were left were rated using a 7-point scale (1 = do not agree at all, 2 = mostly disagree, 3 = somewhat disagree, 4 = neither agree nor disagree, 5 = somewhat agree, 6 = mostly agree, and 7 = very strongly agree; Lafrenière et al., 2012; see Appendix D).

Psychometric characteristics. According to Lafrenière et al. (2012), the GAMS requires additional research to establish some of the psychometric properties because it is a new measurement: "Research on the relations between the GAMS subscales and other related constructs is needed to further test the construct validity of the GAMS" (p. 830). Even though the GAMS is considered to have adequate levels of reliability and validity, reliability was examined by looking at the internal consistency reliability of the subscales. The internal reliability of the subscales had alpha coefficients of $\propto = .75, \propto =$ .88, $\propto$ = .82, $\propto$ = .88, $\propto$ =.75, and $\propto$ = .89 (Lafrenière et al., 2012).

The GAMS appeared to have strong factorial validity and construct validity. Factorial validity was tested using confirmatory factor analysis in three stages, and in each stage the subscales were examined individually to identify items that had a low factor loading on their essential latent factor (Lafrenière et al., 2012). On the first model, data were $S - Bx^2$ (df = 120, N = 138) = 219.0, p = .001, CFI = .94, NNFI = .93, RMSEA = .07 (.04–.09); on the second model, data were $S - Bx^2$ (df = 120, N = 138) = 208.34, p = .001, CFI = .91, NNFI = .93, RMSEA = .07 (.05–.09); on the last model, data were $S - Bx^2$ (df = 125, N = 138) = 211.48, p = .001, CFI = .91, NNFI = .93, RMSEA = .07 (.05–.09; Lafrenière et al., 2012).

GAMS administration. The GAMS is a self-report test that is administered online and takes approximately 5 to 8 minutes to complete. Lafrenière et al. (2012) gave permission to use their scale for research and teaching purposes via Facebook email message.

Basic Needs Satisfaction in General Scale (BNSG-S)

The BNSG-S was developed to measure the construct of psychological needs, which according to SDT is the preexisting condition that compels actions. This construct is composed of three subscales: autonomy, competence, and relatedness (Gagné, 2003). Autonomy refers to choice and desire; competence is a measure of capability and effectiveness at a task, and relatedness refers to a person's feelings of connectedness to others. The BNSG-S belongs to a family of scales under the Basic Psychological Needs Scales that measures satisfaction in work and in relationships. The original scale of the BNSG-S consisted of 21 items. However, instrument instructions also indicated the usefulness of a 9-item measure (three items each from autonomy, competence, and relatedness subscales). I used the 9-item measure to reduce the length of the survey.

I measured each item with a 7-point Likert-type scale. A score of 1 indicates that a statement is "not at all true," a score of 4 indicates that a statement is "somewhat true," and a score of 7 indicates that a statement is "very true." The subscale scores from the questionnaire may be averaged independently of one another to produce three scores reflecting the need for autonomy, relatedness, and competence, or all items may be averaged to provide a composite representation of basic need satisfaction. This study found the composite representation of the gamers' basic need satisfaction (see Appendix E). Higher scores on the BNSG-S indicate higher levels of need satisfaction in the individual.

Psychometric characteristics. The BNSG-S is an instrument that has good reliability and validity for its ability to measure an individual's need satisfaction (Gagne, 2003). Internal consistency for composite need satisfaction scores ranges from .84 to .90 (Gagne, 2003; Meyer, Enstrom, Harstveit, Bowles, & Beevers, 2007; Wei, Schaffer, Young, & Zakalik, 2005). Additionally, the internal consistency of the subscale ranges has been reported as .61 to .81 (autonomy), .60 to .86 (competence), and .61 to .90 (relatedness)(Conroy & Coatsworth, 2007a, 2007b; Gagne, 2003; Kashdan, Julian, Merritt, & Uswatte, 2006; Kashdan, Mishra, Breen, & Froh, 2009; Niemiec, Ryan, & Deci., 2009; Thorgersen-Ntoumani & Ntoumanis, 2007; Vansteenkiste et al., 2006; Wei et al, 2005).

Johnston and Finney (2010) found that this survey's reverse items did not load well, resulting in negative item method effects for five survey items. Because instrument authors do not specify, which items to retain for the 9-item reduced survey, the first items removed to compile the 9-item questionnaire were those with reverse scoring. None of the retained survey items were reverse items. When eliminating additional items, the researcher took Johnston and Finney's (2010) confirmatory factor analysis into consideration. Misfit contributors included item 4, which was written too generally; item 14, which was a better fit with relatedness than with autonomy; and item 20, which was both negative and the reciprocal of item 1.

Gagnè (2003) reported subscale correlations between .61 and .66, justifying a single composite need satisfaction ($\alpha = .89$) index generated from the average of all

subscales. Kasser and Ryan (1993) combined the three need satisfaction scales to obtain a composite measure of basic need satisfaction. Kasser et al. found that the intercorrelations among the three measures ranged from .42 to .53 at Time 1, and .56 to .58 at Time 3. A single composite score representative of need satisfaction was used for the purpose of this study. High scores are indicative of greater reported need satisfaction.

The BNSG-S has been used in several studies, but there still have been no intensive studies conducted on its psychometric properties according to Johnston and Finney (2010). Even so, this scale has been used in several different populations, including university students; however, there is still limited information available on the different norms.

BNSG-S administration. The BNSG-S is a self-report test that was administered online and should take approximately 3 to 5 minutes to complete. The author of the BNSG-S, Gagné (2003), has given permission to use the scale for research and teaching purposes posted.

Gaming Behavior

Past research (Kowert et al., 2012; Kuss & Griffiths, 2012; Liu & Peng, 2009; Van Rooij et al., 2010; Shieh & Cheng, 2007; Suárez & Singh, 2013) has shown that frequency and duration are valid indicators of gaming behavior. Frequency is the numbers of days per week gamers play online, and duration is the average number of hours spent gaming on a typical gaming event (see Appendix C). There are no published psychometrics to report.

Satisfaction With Life Scale (SWLS)

The SWLS was developed to assess an individual's life satisfaction. Life satisfaction can be defined as an overall judgment about a person's life (Diener et al., 1985). The SWLS was derived from a 48-item self-report measure that includes questions related to a person's life satisfaction and measures positive and negative affect properties in an individual's overall concept of subjective well-being (Diener et al., 1985). A factor analysis was conducted, and three factors were identified—negative affect, positive affect, and satisfaction. Any questions having a positive or a negative affect were eliminated from the item bank, and items dealing with satisfaction that had loadings less than .60 were also eliminated from the original 48 items (Diener et al., 1985). The remaining 10 items were reduced to five items because of the high semantic similarity of several of the items. The five items that were left were rated using a 7-point scale (1 = strongly disagree, 2 = disagree, 3 = slightly disagree, 4 = neither agree nor disagree, 5 = slightly agree, 6 = agree, and 7 = strongly agree). A total score that ranges from 31 to 35 implies that the individual's life satisfaction is extremely high. Scores that range from 26 to 30 mean that those individuals are satisfied with their lives; and scores that range from 21 to 25 indicate that individuals are slightly satisfied with their lives. Individuals with a score of 20 are neutral. Individuals with a score that ranges from 15 to 19 are slightly dissatisfied with their lives. Individuals who have a score ranging from 10 to 14 are dissatisfied with their lives. Finally, individuals with a score that ranges from 5 to 9 are extremely dissatisfied with their lives (see Appendix F).

Psychometric characteristics. The SWLS is an instrument that has good reliability and validity for its ability to measure a person's satisfaction with life (Diener et al., 1985). Diener et al. (1985) reported a test–retest reliability of .82 for a 2-month interval. Pavot, Dienter, Colvin, and Sandvik (1991) conducted a test–retest of the SWLS with a 2-week interval at .84 and a 1-month interval at .84. Additionally, Diener et al. (1985) found that the internal consistency correlations ranged from .57 to .75 ($\alpha = .87$) from a sample of undergraduate students; in a sample consisting of older individuals, they found an internal consistency of .63 to .81 (Diener et al., 1985). There are some scores that are not in the acceptable range, but overall the SWLS is considered a reliable instrument for measuring a person's life satisfaction when all the other reliability and validity measures are factored (Diener et al., 1985).

Diener et al. (1985) examined construct validity of the instrument using a principal components factor analysis of an unidimensional structure of life satisfaction, which was confirmed with both student samples and samples of older adults (Diener et al., 1985). The factor analysis revealed single-factor counts for 65% satisfaction with life in the student population and 74% in the sample of older adults (Diener et al., 1985). Pavot et al. (1991) stated that the SWLS has convergent validity with other scales; that is, the SWLS scores were correlated with certain personality measures such as the Fordyce Global Scale ($r = .58$ to $r = .62$) as well as affect balance ($r = .76$) with Bradburn's Affect Balance Scale. The Differential Personality Questionnaire and the Summed Domain Satisfaction were analyzed to show concurrent validity of the SWLS with a correlation

that ranged from $r = .47$ to $r = .68$ of subjective well-being. The SWLS was positively correlated with several measures ($r = 0.54$ with self-esteem, $r = -0.48$ with neuroticism, $r = 0.20$ with sociability, and $r = -0.41$ with the symptom checklist) and weakly correlated with impulse control (Deiner et al., 1985). Dienear et al. (1985) demonstrated discriminant validity of the SWLS, with dimensions of intensity and impulsivity. However, some researchers (Pavot et al, 1993) feel that the discriminant validity of the SWLS needed further exploration.

SWLS administration. The SWLS is a self-report test that was administered online and should take approximately 2 to 3 minutes to complete. Diener et al. (1985) have given permission to use the SWLS for research and teaching purposes.

Relationship Assessment Scale (RAS)

The RAS is a brief instrument that was developed to measure relationship satisfaction (Hendrick et al., 1998). This scale was meant to measure not only matrimonial satisfaction but all relationship satisfaction—of couples who are living together or dating, as well as gay couples and friends—with some minimal changes to the instrument (Hendrick, 1988). Seven items were developed using previous assessments such as the Matrimonial Assessment Questionnaire, the Sexual Attitudes Scale, and the Love Attitude Scale (Hendrick & Hendrick, 2002). The seven items are rated using a 5-point scale (1 = unsatisfied with relationship, 2 = somewhat satisfied, 3 = typically satisfied with relationship, 4 = a little more satisfied than average, and 5 = very satisfied with relationship). The total score is computed by averaging all the scores and ranges

from 1 to 5. An individual who scores high (which is a 5) on the RAS is highly satisfied with his or her current relationships, whereas an individual who scores low has low relationship satisfaction and is not satisfied with his or her current relationships (see Appendix G).

Psychometric characteristics. The RAS measures relationship satisfaction. The RAS is an instrument that has good reliability and validity for its ability to measure a person's relationship satisfaction (Hendrick et al., 1988). Hendrick's (1988) reliability analysis of the RAS yielded an alpha of .86. The RAS has an item-total correlation of .573 to .763 (Hendrick et al., 1988). The score of .573 is considered a little low; a score of .6 or greater is acceptable (Cronbach, 1988). Hendrick et al. stated that the majority of the psychometric characteristics are in the acceptable range; additionally, the reliability of the RAS was reasonable, with an average of .872 across many studies (Graham, Diebels, & Barnow, 2011). At a 6- to 7-week interval, the test–retest was calculated at .85 (Hendrick et al., 1998), and the internal consistency of the RAS was calculated at .86 (Hendrick, 1988).

The RAS also appears to have strong construct validity with a convergent validity of .80 when it is compared with the Dyadic Adjustment Scale. Although there has not been widespread RAS usage by other researchers since publication of the RAS in November 1988, the RAS was chosen over more common and renowned assessments because of its suitability for all types of romantic relationships. Also, the RAS is effective at predicting which couples will stay together versus which will separate.

RAS administration. The RAS is a self-report test that was administered online and should take approximately 2 to 5 minutes to complete. The authors of the RAS, Hendrick et al. (1998), have given permission to use this scale for research and teaching purposes.

Data Analysis

The most current version of the Statistical Package for the Social Sciences (SPSS) was used to analyze the data. All variables were examined using descriptive statistics (e.g., frequency distributions, measures of central tendency, variability, and association) to explore and present their distributional properties and determine whether the data met the assumptions for the proposed mediation analysis. Once this was done, the predictor and outcome variables were examined, and exploratory analyses were conducted and reported to determine whether the data met the criteria for regression and mediation analyses (Hayes, 2013; Kenny 2014).

According to MacKinnon et al. (2012), mediation variables are a central part of psychology because they help to explain complex processes. Mediation models offer an explanation of how a third variable can influence or better explain a specific relationship (Fairchild & MacKinnon, 2009). Bootstrapping (resampling with replacement) was used to examine indirect effects more reliably. The indirect effect was computed from each of these samples, and a sampling distribution could be empirically generated (Kenny, 2014). Kenny's (2014) four-step mediation modeling was proposed:

1. Verify for each model that each predictor variable (psychological needs) is significantly related to the outcome variables (life satisfaction and relationship satisfaction), thereby establishing that there is a relationship that can be mediated in this study.
2. Show that there is a correlation between the mediator (gaming motivation) and the predictor (psychological needs).
3. Test to see whether the mediator in this study is independently, significantly correlated with the outcome variables (gaming behavior, life satisfaction, and relationship satisfaction) when controlling the predictors (psychological needs).
4. Establish whether gaming motivation completely or partially mediates the predictor (psychological needs) and outcome variables (gaming behavior, life satisfaction, and relationship satisfaction).

Because SDT and the GAMS measure six aspects of motivation, these aspects were tested individually in a parallel mediation model as well as in a single average score to determine the best fitting model (Hayes, 2013). Hayes (2013) also made the case that OLS regression in SPSS is capable of estimating equations for a multiple mediator model so that SEM applications are not required to run the analyses. The PROCESS script developed by Hayes (2013) was used to run the analyses. This produced output files to compute mediation of direct and indirect effects (Hayes, 2013). Additionally, a standardized regression equation score of the three psychological needs (autonomy,

relatedness, competence) variables was used to run the simple mediation rather than using three unique variables.

Research Questions and Hypotheses

The research study examined three mediational models to better understand the relationship between psychological needs, gaming behavior, and quality of life. Each mediational model tested two hypotheses.

The independent variable was psychological needs. Psychological needs were measured using the BNSG-S. Each model tested a separate dependent variable. The dependent variables were gaming behavior, life satisfaction, and relationship satisfaction. Gaming behavior was measured by self-reported frequency and duration of time spent playing online games. Life satisfaction was measured using the SWLS. Interpersonal relationships were measured using the RAS. The mediating variable was gaming motivation, which was measured by the GAMS. The data were collected from online gamers.

Model 1: Does gaming motivation mediate the relationship between psychological needs and gaming behavior?

$H1_a$: Psychological needs (as measured by BNSG-S) significantly predicts online gamers' gaming behavior (as measured by frequency and duration).

$H1_0$: Psychological needs (as measured by BNSG-S) do not significantly predict online gamers' gaming behavior (as measured by frequency and duration).

$H2_a$: Gaming motivation (as measured by GAMS) mediates the relationship between psychological needs (as measured by BNSG-S) and gaming behavior (as measured by frequency and duration) among online gamers.

$H2_0$: Gaming motivation (as measured by GAMS) does not mediate the relationship between psychological needs (as measured by BNSG-S) and gaming behavior (as measured by frequency and duration) among online gamers.

Model 2: Does gaming motivation mediate the relationship between psychological needs and life satisfaction?

$H3_a$: Psychological needs (as measured by BNSG-S) significantly predicts online gamers' life satisfaction (as measured by SWLS).

$H3_0$: Psychological needs (as measured by BNSG-S) do not significantly predict online gamers' life satisfaction (as measured by SWLS).

$H4_a$: Gaming motivation (as measured by GAMS) mediates the relationship between psychological needs (as measured by BNSG-S) and life satisfaction (as measured by SWLS) among online gamers.

$H4_0$: Gaming motivation (as measured by GAMS) does not mediate the relationship between psychological needs (as measured by BNSG-S) and life satisfaction (as measured by SWLS) among online gamers.

Model 3: Does gaming motivation mediate the relationship between psychological needs and relationship satisfaction?

$H5_a$: Psychological needs (as measured by BNSG-S) significantly predicts online gamers' relationship satisfaction (as measured by RAS).

$H5_0$: Psychological needs (as measured by BNSG-S) do not significantly predict online gamers' relationship satisfaction (as measured by RAS).

$H6_a$: Gaming motivation (as measured by GAMS) mediates the relationship between psychological needs (as measured by BNSG-S) and relationship satisfaction (as measured by RAS) among online gamers.

$H6_0$: Gaming motivation (as measured by GAMS) does not mediate the relationship between psychological needs (as measured by BNSG-S) and relationship satisfaction (as measured by RAS) among online gamers.

Threats to Validity

Threats to external validity occur when the researcher makes inaccurate inferences and generalizations to the accessible population (Gravetter & Wallnanu, 2009). The study utilized a convenience sample with volunteer participants, so sampling error could not be estimated. Therefore, the results had weak external validity and were interpreted with caution. Demographic data may allow descriptive comparisons with previously published studies.

Threats to internal validity occur when extraneous factors allow for alternative explanations of what caused a given effect on the dependent variable in a study (Gravetter & Wallnanu, 2009). The nature of this study, using a convenience sampling and a correlational design, prevented I from having a comparison or control group. This

leaves the internal validity of the study weak because I had little control over who decided to participate in the study as well as the research conditions at the time the participants completed the surveys. Issues such as maturation or history were not relevant to this study (Gresham, 2014).

Threats to construct validity refer to how well the constructs have been operationalized in the study (Gravetter & Wallnau, 2009). To maximize construct validity, all the measures used have been vetted either through their use and reported psychometrics from other reputable studies or through procedural, face, and content validity reviews by the researcher.

Threats to statistical conclusion validity can occur in situations in which there is a low statistical power (e.g., if the sample size is not sufficient per the a priori power analysis). The results can cause the study to have an inflation of a Type II error, which leads to the incorrect acceptance of the null hypothesis (Gravetter & Wallnau, 2009). Statistical conclusion validity may also be a problem if the data do not meet the assumptions of the chosen statistics. I reported the results to determine that the assumptions had been met.

Ethical Procedures

Before proceeding with data collection, I presented a description of the study methods and procedures to the Institutional Review Board (IRB) of Walden University. Once IRB approval was given, an invitation to the study that included the link to the online survey hosted by SurveyMonkey was posted on the previously mentioned websites

and Facebook page. The invitation (see Appendix A) briefly described the study and criteria for inclusion. When participants clicked on the link that was provided, they were redirected to a webpage where they read the consent form and had the option to participate or not participate (see Appendix B). Clicking on the link to participate indicated informed consent, and the online survey commenced. If the participants did not consent, they were sent to a thank-you page. Anytime during the survey, participants could choose not to continue the survey by exiting. Furthermore, all participants were informed that they could withdraw without experiencing any negative consequences. No personal identifying information, such as names, addresses, or Social Security numbers, was gathered during this process.

To help protect participant privacy and confidentiality, the information collected for this study was placed on the online site SurveyMonkey, which has secure connections. SurveyMonkey is a survey data site that millions use, and its security measures are broken into six components: application and user security, physical security, availability, network security, storage security, and organizational and administrative security (Survey Money, n.d). The application and user security include the following components: SSL/TLS encryption, user authentication, user passwords, data encryption, data portability, and privacy. The physical security is composed of data centers, data center security, environmental controls, and location. The availability of SurveyMonkey includes connectivity, power, uptime, and failover. The network security includes uptime, third-party scans, testing, firewalls, patching, access control, and

logging and auditing. The storage security is made up of two parts: backup frequency and production redundancy. The organizational and administrative security includes employee screening, training, service providers, access, audit logging, and information security policies. The participants' information was downloaded onto a password-protected flash drive and was kept in a locked file cabinet. After the appropriate time has passed (7 years), the data will be destroyed.

Printed documents were kept in a locked file cabinet until the completion of data analysis, and then those documents were destroyed by being shredded. All raw data were accessible to dissertation committee, approved eligible professionals, and me for educational or research purposes.

Summary

The purpose of this chapter was to describe the research methodology for this nonexperimental quantitative study. This study had three models. The first model explored the relationship between psychological needs and gaming behavior. The second explored the relationship between psychological needs and life satisfaction. The third examined the relationship between psychological needs and relationship satisfaction. In all cases, I evaluated whether gaming motivation mediated the relationship between the psychological needs and the dependent variables of each model. Data were obtained from a convenience sampling of online gamers around the world. Self-report surveys—the BNSG-S, SWLS, RAS, GAMS, and gaming behavior (frequency and duration of time spent playing online games)—were used for data collection together with a demographic

survey. Multiple regression analysis was used to assess the predictive and mediation relationships in this study. Particular emphasis was placed on the protection of the participants' rights, which ensured that this study was ethically sound. Chapter 4 examines the data collection and the results of the study.

Chapter 4: Results

This study addressed three mediational models in an attempt to better understand the relationship between gamers' psychological needs, gaming behaviors, and quality of life. Survey data were gathered from a nonrandom sample of 935 gamers who visited the listservs and subsites of different MMORPGs and virtual reality games. The first model addressed the relationship between the online gamers' psychological needs (predictor variables) and their gaming behavior (outcome variable). The second model addressed the relationship between the online gamers' psychological needs (predictor variables) and their life satisfaction (outcome variable). The third model addressed the relationship between the online gamers' psychological needs (predictor variables) and their relationship satisfaction (outcome variable). In all three models, gaming motivation, as measured by the Gaming Motivation Scale (GAMS), was investigated as a possible mediator between the predictor variable and the outcome variable. This chapter includes the study design, participants, data collection methods, and results of the analysis. The specific research questions and hypotheses addressed in this study are presented below.

Research Questions and Hypotheses

Research Question 1: Does gaming motivation mediate the relationship between psychological needs and gaming behavior?

$H1_a$: Psychological needs (as measured by BNSG-S) significantly predict online gamers' gaming behavior (as measured by frequency and duration).

$H1_0$: Psychological needs (as measured by BNSG-S) do not significantly predict online gamers' gaming behavior (as measured by frequency and duration).

$H2_a$: Gaming motivation (as measured by GAMS) mediates the relationship between psychological needs (as measured by BNSG-S) and gaming behavior (as measured by frequency and duration) among online gamers.

$H2_0$: Gaming motivation (as measured by GAMS) does not mediate the relationship between psychological needs (as measured by BNSG-S) and gaming behavior (as measured by frequency and duration) among online gamers.

Model 2: Does gaming motivation mediate the relationship between psychological needs and life satisfaction?

$H3_a$: Psychological needs (as measured by BNSG-S) significantly predict online gamers' life satisfaction (as measured by SWLS).

$H3_0$: Psychological needs (as measured by BNSG-S) do not significantly predict online gamers' life satisfaction (as measured by SWLS).

$H4_a$: Gaming motivation (as measured by GAMS) mediates the relationship between psychological needs (as measured by BNSG-S) and life satisfactions (as measured by SWLS) among online gamers.

$H4_0$: Gaming motivation (as measured by GAMS) does not mediate the relationship between psychological needs (as measured by BNSG-S) and life satisfactions (as measured by SWLS) among online gamers.

Model 3: Does gaming motivation mediate the relationship between psychological needs and relationships satisfaction?

$H5_a$: Psychological needs (as measured by BNSG-S) significantly predict online gamers' relationships satisfaction (as measured by RAS).

$H5_0$: Psychological needs (as measured by BNSG-S) do not significantly predict online gamers' relationships satisfaction (as measured by RAS).

$H6_a$: Gaming motivation (as measured by GAMS) mediates the relationship between psychological needs (as measured by BNSG-S) and relationships satisfaction (as measured by RAS) among online gamers.

$H6_0$: Gaming motivation (as measured by GAMS) does not mediate the relationship between psychological needs (as measured by BNSG-S) and relationships satisfaction (as measured by RAS) among online gamers.

Data Collection and Screening

The required sample size for this study was determined using G*Power 3.1.9.2 (Faul, 2014). Because this was a mediational study, the required sample size was estimated to be 125 using an linear multiple regression model for R^2 increase, a moderate effect size = .10, α = .05, β = .80, and four total predictors, which included three psychological needs scales and an overall gaming motivation scale.

Participants completed the survey hosted online at SurveyMonkey.com during a 3-week period from February to March 2016. Participants were invited to participate in the study through advertisements on listservs and Facebook pages, as well as flyers

posted at game retail stores, office shops, and libraries. Due to the rapid response of participants, it was unnecessary to post the survey on the Walden participation pool site (noted in Chapter 3). Participants were required to confirm that they were at least 18 years old, capable of reading and understanding English, currently or previously in a long-term romantic relationship for at least 1 year, and playing MMORPGs, online virtual reality games, or both.

A total of 1222 individuals self-selected to participate in the study. Survey Monkey removed 220 surveys that had partial responses from the data set. Further inspection of the data revealed 30 surveys with nonsensical responses (e.g., “skid road”) or noncompliant responses (e.g., using words instead of numbers for days or hours), which were removed from the data set. Despite indicating their age during the screening process, some participants reported that they were younger than 18 years of age during the survey itself; consequently, those surveys were also removed from the data set. Finally, a missing data analysis was used to identify nonrandom patterns of missing or incorrect values, and 29 cases were found that had consistently out-of-range values across the questionnaire responses. These cases were also removed from the data set, which left a total of 935 cases for analysis.

Descriptive Statistics

The majority of study participants were male *(n* = 497, 53.2%), while female participants (*n* = 432) accounted for only 46.2%. Caucasians made up the majority of the sample population (*n* = 602, 64.4%). The other reported ethnic groups, in order of largest

to smallest number of participants, included African American (*n* = 98, 10.4%), Hispanic (*n* = 97, 10.4%), Asian (*n* = 83, 8.9%), Other/Unspecified (*n* = 26, 2.8%), Native American (*n* =15, 1.6%), and Native Hawaiian (*n* = 14, 1.5%). Six participations elected not to provide their gender or ethnic group.

The participants also identified their preferred type of online game: MMORPGs or online virtual reality games. Most of the participants (*n* = 487, 48.4%) played only MMORGPs instead of online virtual reality games (*n* = 187, 19.8%), and approximately 30.6% (*n* = 286) played both types of games. Six participants elected not to indicate which type of game they preferred. Demographic information on the reported gender, ethnicity, and online game preference of participants is presented in Table 1.

Table 1

*Demographic Characteristics of the Study Participants (*N = *935)*

	Number	Percent	Valid Percent
Gender			
Male	497	53.2	53.5
Female	432	46.2	46.5
Missing	6	.6	
Total	935	100.0	100.0
Ethnicity			
Native American	15	1.6	1.6
Asian	83	8.9	8.9
African	98	10.4	10.4
Hispanic	97	10.4	10.4
Caucasian	602	64.4	64.4
Native Hawaiian	14	1.5	1.5
Other	26	2.8	2.8
Total	935	100.0	100.0
Type of Game Played			
MMORGPs	456	48.4	49.1
Online Virtual Reality Games	187	19.8	20.1
Both MMORGPs & Online Virtual Reality Games	286	30.6	30.8
Missing	6	.6	
Total	935	100.0	100.0

The reported ages of the study participants ranged from 18 to 67 years old (*M* = 33.37, *SD* = 10.72). On average, participants reported playing 15.76 hours a week (*SD* = 13.26) and the shape of the distribution for these reported values was extremely leptokurtic (skewness of 2.31, kurtosis of 8.93). Participants reported playing online games an average of 8.32 times per week (*SD* = 8.22) and the distribution of these

reported values was also nonnormal (skewness of 3.36, kurtosis of 15.32), with 20 cases greater than 3 standard deviations from the mean. Charlton and Danforth's (2007) study indicated that people who are addicted to playing online will spend approximately 31.92 hours per week; Griffiths et al. (2007) noted some individuals played more than 70 hours a week, which is consistent with my study in that some individuals played as much as 55.56 hour per week. Another study indicated that 29% of participants played MMORPGs games 6–7 days a week (Hellström, Nilsson, Leppert, & Åslund, 2012), which is also consistent with my study that indicated an average of 7 days a week. Therefore, the analyses for testing the research questions were conducted with the outliers included.

The GAMS was used to evaluate gaming motivation of the participants. The participants' (N = 935) gaming motivation was 4.75 (SD = 1.92) on average, with a median of 12 and a nonnormal, positively skewed, leptokurtic distribution (skewness of 8.08, kurtosis of 107.59). The mediation analyses included nonparametric, distribution-free bootstrapping techniques. The basic or psychological needs of each participant were assessed using the BSNG-S. Psychological needs were evaluated on three subscales: autonomy, competence, and relatedness (Gagné, 2003). These values were all normally distributed. Finally, the SWLS was used to evaluate the life satisfaction of participants, and the RAS was used to evaluate their relationship satisfaction. Both were normally distributed. The descriptive statistics of other motivations (i.e., intrinsic, integrated

regulation, identified regulation, introjected regulation, external regulation, and amotivation), the BSNG-S, the SWL, and the RAS are listed in Table 2.

Table 2

*Descriptive Statistics of the Sample (*N = *935)*

	Minimum	Maximum	Mean	*SD*	Skewness	Kurtosis
Age	18.00	67.00	33.37	10.72	.78	.04
How much time do you spend weekly playing online games? The number of hours per week.	0.00	100.00	15.76	13.26	2.31	8.93
How many times out of week you play online games? The number of times per week.	0.00	72.00	8.34	8.22	3.36	15.32
Overall Intrinsic Motivation	1.00	7.00	5.38	1.30	-1.07	.99
Overall Integrated Regulation	1.00	7.00	4.62	1.50	-.33	-.43
Overall Identified Regulation	1.00	7.00	4.76	1.46	-.46	-.33
Overall Introjected Regulation	1.00	7.00	4.07	1.73	-.03	-.96
Overall External Regulation	1.00	7.00	5.28	1.36	-.81	.30
Overall Amotivation	1.00	7.00	3.75	1.71	.09	-.91
Overall GAMS	1.00	35.00	4.75	1.92	8.08	107.55
Overall Autonomy on the BNSG	1.00	7.00	5.78	1.21	-1.15	1.26
Overall Relatedness on the BNSG	1.00	7.00	5.61	1.11	-.82	.60
Overall Competence on the BNSG	1.00	7.00	5.51	1.18	-.85	.77
SWLS Total Score	5.00	35.00	24.88	6.45	-.66	.17
RAS Overall Score	1.71	5.00	3.71	0.58	-.18	.66

Results

For all mediational analyses, a simple mediation model was computed using the Hayes PROCESS tool to compute the direct and indirect effects (Hayes, 2013). Additionally, a standardized regression equation score for all three variables of psychological needs (autonomy, relatedness, competence) was used to run a simplified mediation rather than using three unique variables.

Model 1

Does gaming motivation mediate the relationship between psychological needs and gaming behavior? To address the first research question, correlations between the predictor (i.e., psychological needs) and criterion variables (gaming behavior, which included time and frequency of playing) were examined. These are presented in Figure 5.

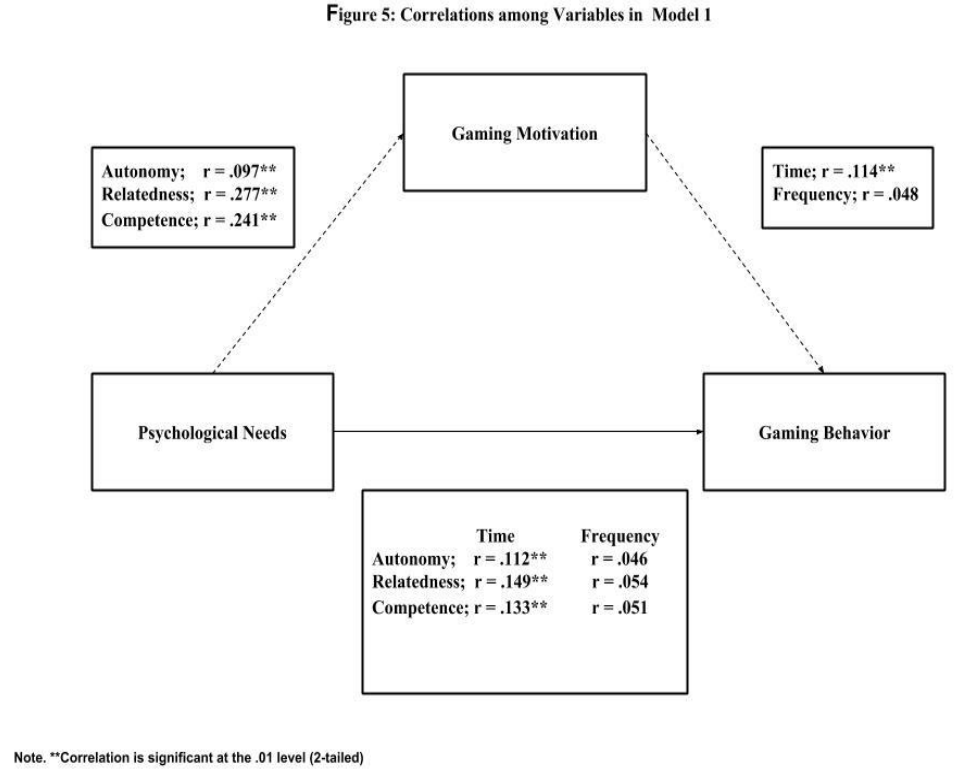

Figure 5. Correlations among variables in Model 1

Correlational analysis for the model. There were significant positive correlations, ranging from r = .10 to .28 between the psychological needs variables and the GAMS (p < .01). The GAMS scores were positively correlated with both time (r =

.11, $p < .01$) and frequency ($r = .05$, $p = .14$) of game play. Psychological needs were significantly correlated ($p < .01$) with the time spent playing, ranging from $r = .11$ to .15, but not with the frequency of play ($r = .05$, $p = .05$).

Multiple regression analyses for the model. A standard multiple regression analysis was used to evaluate how well psychological needs, in terms of autonomy, relatedness, and competence, predicted the time gamers spent playing. The regression was statistically significant ($R^2 = .025$, $F(3,931) = 7.916$, $p < .001$). However, only 2.5% of the variance was in time spent paying, which means that 97.5% of the variance was not explained and therefore this was not meaningful, which will be addressed in Chapter 5. Of the three variables included in the measure of psychological needs, relatedness was the strongest predictor of the time spent playing online games ($\beta = .103$, $p = .019$), while autonomy and competence were not significant ($\beta = .014$ and .059, respectively, $p = .18$). These data are presented in Table 3.

Table 3

*Regression of Psychological Needs With the Time Spent Playing Games (*N = *935)*

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	*SE*	*β*	*t*	*p*	Tolerance	VIF
1	(Constant)	4.304	2.447		1.759	.079		
	Overall Autonomy on the BNSG	.153	.478	.014	.320	.749	.548	1.825
	Overall Relatedness on the BNSG	1.231	.526	.103	2.342	.019	.537	1.864
	Overall Competence on the BNSG	.665	.504	.059	1.319	.188	.516	1.936

R^2 = .025, F(3,931) = 7.916, p < . 001

Similarly, a standard multiple regression analysis was used to evaluate how well the same measurements of psychological needs (i.e., autonomy, relatedness, and competence) predicted the gamers' frequency of game play. This relationship was not found to be statistically significant (R^2 = .003, F(3,931) = 1.077, p = .358), indicating that none of the three psychological needs predicted the gamers' frequency of game play. The results are shown in Table 4.

Table 4

Regression of Psychological Needs With the Frequency of Game Play (= 935)

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	*SE*	*β*	*t*	*p*	Tolerance	VIF
1	(Constant)	5.644	1.533		3.681	.000		
	Overall Autonomy on the BNSG	.094	.299	.014	.312	.755	.548	1.825
	Overall Relatedness on the BNSG	.231	.329	.031	.702	.483	.537	1.864
	Overall Competence on the BNSG	.156	.316	.022	.494	.621	.516	1.936

$R^2 = .003$, $F(3,931) = 1.077$, $p = .358$

Finally, a standard multiple regression analysis was used to evaluate how well the same measurements of psychological needs (i.e., autonomy, relatedness, and competence) predicted gaming motivation. This relationship was found to be statistically significant ($R^2 = .101$, $F(3,931) = 34.761$, $p < .001$) with all three measurements of psychological needs. Overall relatedness was the strongest predictor ($\beta = .268$, $p < .01$), while autonomy had a negative standard coefficient ($\beta = -.174$, $p < .01$). These results are shown in Table 5.

Table 5

*Regression of Psychological Needs with the GAMS (*N = *935)*

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	*SE*	*β*	*t*	*p*	Tolerance	VIF
1	(Constant)	2.144	.340		6.302	.000		
	Overall Autonomy on the BNSG	-.276	.066	-.174	-4.146	.000	.548	1.825
	Overall Relatedness on the BNSG	.461	.073	.268	6.307	.000	.537	1.864
	Overall Competence on the BNSG	.292	.070	.180	4.172	.000	.516	1.936

R^2 = .101, $F(3,931) = 34.761$, $p < .001$

Mediation analysis for the model, hours per week. The results of the total model for hours per week of game play are presented in Table 6. The overall model, which included psychological needs and gaming motivation as predictors of hours of game play per week, was statistically significant ($R^2 = .025$, $F(2,932) = 8.168$, $p < .01$). However, examination of the direct and indirect effects revealed that the variance in hours per week of game play was significantly accounted for by psychological needs alone, and the indirect effect of gaming motivation was not significant (b = .324, *SE* = .272, 95% CI = -.0012, .964). The normal theory test found that $z = 1.048$ ($p = .295$) for time spent playing online games. The bootstrap confidence intervals are represented by LLCI and ULCI.

Table 6

*Mediation Model 1: Gaming Motivation and Psychological Needs on Time Spent Playing (*N = *935)*

Mediation Model 1						
	coeff	*SE*	*t*	*p*	LLCI	ULCI
constant	13.228	2.302	5.747	<.001	8.711	17.744
gamscore	.533	.496	1.073	.284	-.441	1.506
psychneed	1.526	.510	2.991	.003	.525	2.527
R^2 = .025, F(2,932) = 8.168, p < .01						
Direct and Indirect Effects						
Direct effect of X on Y						
	Effect	*SE*	*t*	*p*	LLCI	ULCI
	1.525	.510	2.991	.003	.525	2.527
Indirect effect on X on Y						
	Effect	Boot *SE*	Boot LCI	Boot ULCI		
gamscore	.324	.272	-.001	.964		

Mediation analysis for the model, frequency of game play. The results of the total model and frequency of game play are presented in Table 7. The overall model, which included psychological needs and gaming motivation as predictors of frequency of game play per week, was not found to be statistically significant (R^2 = .005, F(2,932) = 67.328, p =.170). Closer examination of the direct and indirect effects revealed that the variance in frequency of play per week was not significantly accounted for by either psychological needs or the indirect effect of gaming motivation (b = .075, *SE* = .110,

95% CI = -.039, .376). The normal theory test found that $z = .712$ ($p = .477$) for the frequency of online game play.

Table 7

*Mediation Model 1: Gaming Motivation and Psychological Needs on Frequency of Game Play (*N = *935)*

Mediation Model 1						
	coeff	*SE*	*t*	*p*	LLCI	ULCI
constant	7.633	.978	7.801	<.001	5.713	9.553
gamscore	.149	.208	.718	.473	-.259	.557
psychneed	.408	.302	1.352	.177	-.184	1.001
$R^2 = .005$, $F(2,932) = 67.328$, $p = .170$						
Direct and Indirect Effects						
Direct effect of X on Y						
	Effect	*SE*	*t*	*p*	LLCI	ULCI
	.408	.302	1.352	.177	-.184	1.001
Indirect effect on X on Y						
	Effect	Boot *SE*	Boot LCI	Boot ULCI		
gamscore	.075	.110	-.039	.376		

Model 2

Does gaming motivation mediate the relationship between psychological needs and life satisfaction? Correlations among the predictor (i.e., psychological needs) and criterion variable (life satisfaction) were examined to address the second research question. These are presented in

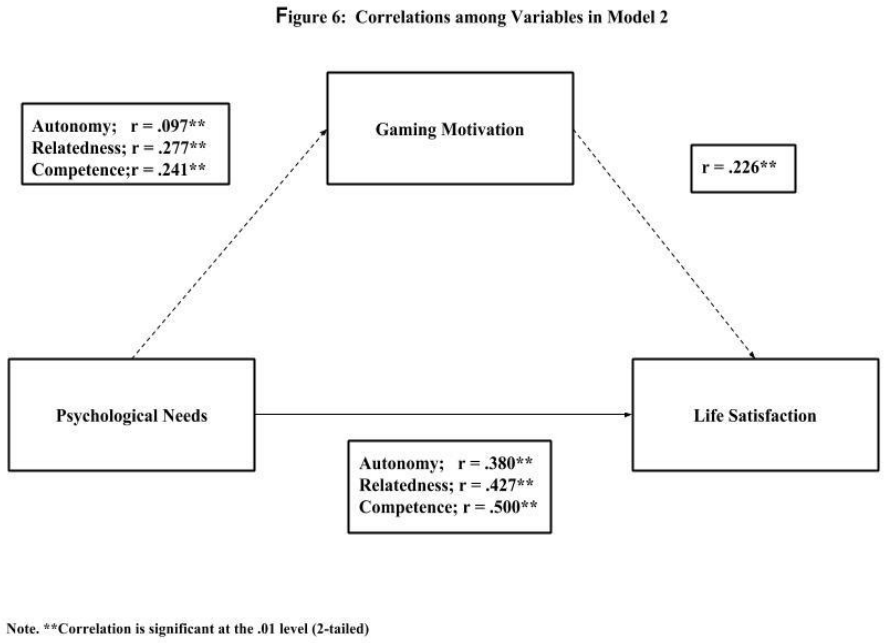

Figure 6. Correlations among variables in Model 2

Correlational analysis for the model. There was a strong positive correlation between most of the predictor variables and the GAMS (r = .097-.277, p < .01). The GAMS scores were positively correlated with life satisfaction (r = .266, p < .01), and psychological needs were also significantly correlated with life satisfaction (r = .380-.500, p < .01).

Multiple regression analyses for the model. A multiple regression analysis was used to evaluate how well psychological needs (i.e., autonomy, relatedness, and competence) predicted the gamers' life satisfaction, and found the relationship to be statistically significant (R^2 = .273, F(3,931) = 116.476, p < .001). Of the three psychological needs variables, competence was the strongest predictor of the gamers' life

satisfaction (β = .358, p < .001), while autonomy was not significant (β = .060, p = .110). These results are shown in Table 8.

Table 8

*Regression of Psychological Needs with Life Satisfaction (*N = *935)*

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	*SE*	Beta	*t*	Sig.	Tolerance	VIF
1	(Constant)	6.877	1.028		6.691	.000		
	Overall Autonomy on the BNSG	.321	.201	.060	1.600	.110	.548	1.825
	Overall Relatedness on the BNSG	.962	.221	.166	4.359	.000	.537	1.864
	Overall Competence on the BNSG	1.950	.212	.358	9.213	.00	.516	1.936

R^2 = .273, F(3,931) = 116.476, p < .001

Mediation analysis for the model. The results of the complete model of gamers' life satisfaction are presented in Table 9. The overall model, which included psychological needs and gaming motivation as predictors of gamers' life satisfaction, was statistically significant (R^2 = .281, F(2,932) = 161.805, p < .01). The variance in the life satisfaction of gamers was significantly accounted for by psychological needs and the indirect effect of gaming motivation (b = .160, *SE* = .098, 95% CI = .021, .383). The normal theory test found that z = 3.023 (p = .003) for the gamers' life satisfaction, suggesting that gaming motivation mediated the relationship between psychological

needs and life satisfaction. The bootstrap confidence intervals are represented by LLCI and ULCI.

Table 9

*Mediation Model 2: Gaming Motivation and Psychological Needs on Life Satisfaction (*N *= 935)*

Mediation Model 2						
	coeff	*SE*	*t*	*p*	LLCI	ULCI
constant	23.379	.762	30.665	<.001	21.882	24.875
gamscore	.316	.160	1.972	.049	.002	.630
psychneed	3.208	.225	14.230	.000	2.765	3.650
R^2 = .281, $F(2,932)$ = 161.805, p < .01						
Direct and Indirect Effects						
Direct effect of X on Y						
	Effect	*SE*	*t*	*p*	LLCI	ULCI
	3.208	.225	14.230	<.001	2.765	3.650
Indirect effect on X on Y						
	Effect	Boot *SE*	Boot LCI	Boot ULCI		
gamscore	.160	.098	.021	.383		

Model 3

Does gaming motivation mediate the relationship between psychological needs and relationship satisfaction? Correlations among the predictor (i.e., psychological needs) and criterion variable (relationship satisfaction) were examined to address the third research question. These results are presented in Figure 7.

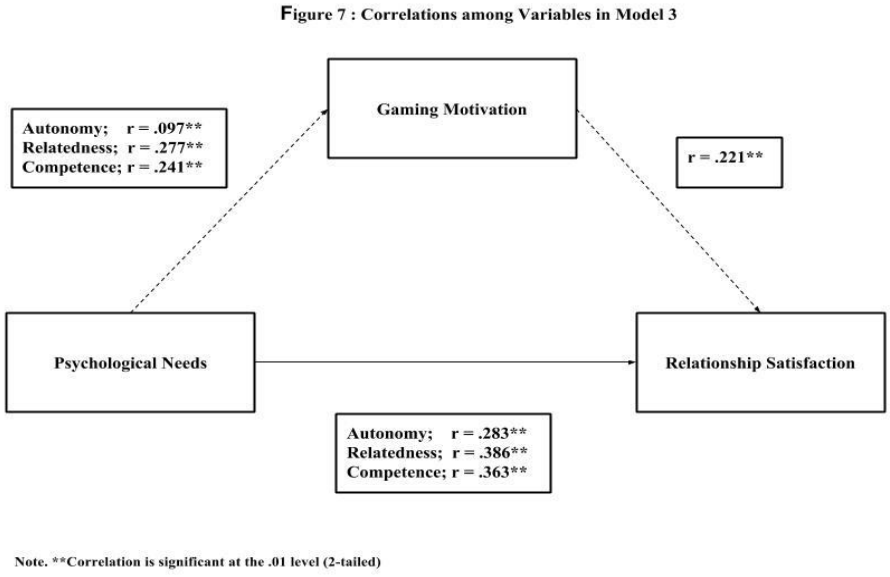

Figure 7. Correlations among variables in Model 3

Correlational analysis for the model. There was a significant positive correlation between the psychological needs variables (i.e., autonomy, relatedness, and competence) and the GAMS (r = .097-.277, p < .01). The GAMS scores were positively correlated with relationship satisfaction (r = .221, p < .01). Psychological needs were significantly correlated with relationship satisfaction (r = .283-.386, p < .01).

Multiple regression analyses for the model. A multiple regression analysis was used to evaluate how well the psychological needs predicted the gamers' relationship satisfaction (R^2 = .173, $F(3,931)$ = 64.976, p < .001). Of the three psychological needs variables, relatedness was the strongest predictor of the gamers' relationship satisfaction

β = .258, p < .001), while autonomy was not significant (β = .009, p = .818). These results are shown in Table 10.

Table 10

*Regression of Psychological Needs with Relationship Satisfaction (*N = *935)*

		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
Model		*B*	*SE*	β	*t*	*p*	Tolerance	VIF
1	(Constant)	2.402	.099		24.290	.000		
	Overall Autonomy on the BNSG	.001	.019	.009	.231	.818	.548	1.825
	Overall Relatedness on the BNSG	.135	.021	.258	6.34	.000	.537	1.864
	Overall Competence on the BNSG	.096	.020	.195	4.713	.000	.516	1.936

R^2 = .173, F(3,931) = 64.976, p < .001

Mediation analysis for the model. The results of the complete model of the gamers' relationship satisfaction are presented in Table 11. The overall model, which included psychological needs and gaming motivation as predictors of the gamers' relationship satisfaction, was statistically significant (R^2 = .184, F(2,932) = 70.668, p < .01). The variance in the gamers' relationship satisfaction was significantly accounted for by psychological needs, and gaming motivation was also found to be a significant mediator (b = .019, *SE* = .014, 95% CI = .004, .057). The normal theory test found that z = 1.504 (p = .133) for the gamers' relationship satisfaction, suggesting that gaming motivation mediated the relationship between psychological needs and relationship

satisfaction although it did not pass the normal theory test. The bootstrap confidence intervals are represented by LLCI and ULCI.

Table 11

*Mediation Model 3: Gaming Motivation and Psychological Needs With Relationship Satisfaction (*N = *935)*

Mediation Model 3						
	coeff	*SE*	*t*	*p*	LLCI	ULCI
constant	3.553	.102	34.729	<.001	3.353	3.754
gamscore	.034	.022	1.532	.126	-.009	.077
psychneed	.224	.024	9.452	.000	.177	.270
R^2 = .184, F(2,932) = 70.668, p < .01						
Direct and Indirect Effects						
Direct effect of X on Y						
	Effect	*SE*	*t*	*p*	LLCI	ULCI
	.224	.024	9.452	<.001	.177	.270
Indirect effect on X on Y						
	Effect	Boot *SE*	Boot LCI	Boot ULCI		
gamscore	.019	.014	.004	.057		

Summary

Chapter 4 investigated three mediational models to better understand the relationship between the gamers' psychological needs, gaming behavior, relationship satisfaction, and life satisfaction. The findings for each of the hypotheses are presented, including correlational results in figures and tabulated results of the multiple regressions and mediation results. Descriptive statistics determined that most of the participants were Caucasian males and participants ranged in age from 18 to 67. The average time a spent

playing game was around 15.76 hours a week, with an extremely skewed data distribution; this was accounted for when doing the analysis. On average, participants played online games 8.32 times per week; however, the distribution was non-normal and 20 cases fell more than 3 standard deviations outside the mean. The overall gaming motivation distribution was also non-normal, positively skewed, and leptokurtic (skewness of 8.08, kurtosis of 107.59). The distributions of the psychological needs (i.e., autonomy, competence, and relatedness), life satisfaction, and relationship satisfaction were relatively normal. Three models were tested using the Hayes PROCESS model (Hayes, 2013) for simple mediational analysis. The three psychological needs variables were combined as a sum to create a single predictor, gaming motivation was the mediator, and the three dependent variables were the time spent playing games in hours per week and frequency of game play, life satisfaction, and relationship satisfaction.

Model 1, which included psychological needs and gaming motivation as predictors of frequency of game play per week, was not found to be statistically significant ($R^2 = .005$, $p = .170$). In model 2, the overall model included psychological needs and gaming motivation as predictors of gamers' life satisfaction, and this was statistically significant, $R^2 = .281$, $F(2, 932) = 161.805$, $p < .01$. The direct effect of psychological needs was significant, $b = 3.2018$, $t = 14.23$, $p<.001$. And, the indirect effect (via gaming motivation) was also significant, ($b = .160$, *SE* = .098, 95% CI = .021, .383), suggesting that as gaming motivation increases, the relationship between psychological needs and life satisfaction strengthens. In model 3, the overall model

included psychological needs and gaming motivation as a predictors of gamers' relationship satisfaction, and was statistically significant $R^2 = .18$, $F (2, 932) = 70.67$, $p < .01$. And, the indirect effect (via gaming motivation) was also significant ($b = .019$, *SE* = .014, 95% CI = .004, .057).

These findings suggest that gaming motivation as a mediator allows researchers and online gamers to see how gaming motivation influence the relations between the gamers' psychological needs and gaming behavior, life satisfaction, and relationship satisfaction. A summary of this study, the relevance of these findings, their potential impact on social change, and recommendations for future research are discussed in Chapter 5.

Chapter 5: Discussion, Conclusions, and Recommendations

This chapter is divided into six sections, beginning with an overview of the study. The second section presents interpretations of the study results in the context of the relevant literature and theoretical framework that was presented in Chapter 2. The third section is a discussion of the limitations and general applicability of the study findings. The fourth section includes recommendations for action, and the fifth section indicates recommendations for future research. The chapter concludes with a discussion of the social implications of the study.

Globally, there has been an increase in the number of people playing MMORPGs and virtual reality games online ("Worldwide Online," 2007). Because of this increase, considerable research has been conducted to determine the effects of online gaming on addiction issues, problematic playing, personality traits, and the psychology of computer usage (Baird, 2010; Chen et al., 2008; Fang et al., 2009; Griffiths, 2010; Young & Whitty, 2010). In addition to these constructs, social psychological factors (e.g., psychological needs) may influence gaming motivation and affect individuals' gaming behavior and quality of life. According to Wan and Chan (2006), there has not been enough research focused on how online gaming affects a player's well-being. Research has shown that online gaming can negatively affect relationship satisfaction (Huang, 2010), life satisfaction (Ryan & Deci, 2000b), and gaming behavior (Shieh & Cheng, 2007). Young (2009) stated online gaming can affect the gamer's quality of life. According to Fairchild and MacKinnon (2009) and MacKinnon et al. (2012), a mediation

model can explain how a third variable influences a particular relationship. This study addressed the potential role of gaming motivation as a mediator between gamers' psychological needs, gaming behavior, and quality of life using mediational modeling.

The specific research questions of this study were as follows: (a) Model 1: Does gaming motivation mediate the relationship between psychological needs and gaming behavior? (b) Model 2: Does gaming motivation mediate the relationship between psychological needs and life satisfaction? (c) Model 3: Does gaming motivation mediate the relationship between psychological needs and relationship satisfaction? Mediational models were used to investigate gaming motivation as a possible mediator between online gamers' psychological needs (predictor variables) and their gaming behavior (first outcome variable), life satisfaction (second outcome variable), and relationship satisfaction (third outcome variable).

Quantitative survey data were gathered on player demographics, gaming behavior (time and frequency of playing online virtual reality games and MMORPGs), gaming motivation (measured by the GAMS), psychological needs, life satisfaction, and relationship satisfaction. Three models, corresponding with the three research questions, were tested using correlation analysis, multiple regressions, and mediation analysis. Each of the three components of psychological needs (i.e., autonomy, relatedness, and competence) was considered separately for each model. To accomplish this, multiple regressions were used to address the first hypothesis of each research question. However, when investigating gaming motivation as a mediator between psychological needs and

the three dependent variables of gaming behavior (time and frequency), life satisfaction, and relationship satisfaction, a single variable was needed to represent all three types of psychological needs. A standardized regression equation score was used for this purpose. All three models demonstrated a significant positive relationship between psychological needs and gaming motivation.

Gaming motivation variables were positively correlated with time and frequency in Model 1. Psychological needs were significantly correlated with the total time played, but not with the frequency of game play. Of the three psychological variables, relatedness was the strongest predictor of the total time spent playing online games. Similarly, psychological needs best predicted gaming behavior. Again, relatedness was the strongest predictor of overall gaming behavior, although competence was also significant. In contrast, autonomy was a negative predictor of gaming behavior. These findings indicated that gaming motivation mediated the relationship between psychological needs and gaming behavior, answering the first research question. Furthermore, gaming motivation as a mediator diminished the relationship between the gamers' psychological needs and the total time spent playing online games.

In Model 2, there was a strong positive correlation between the GAMS and both the gamers' psychological needs and life satisfaction; thus, psychological needs also predicted gamers' life satisfaction. Specifically, competence was the strongest predictor of gamers' life satisfaction, but relatedness was also significant. These results indicated

that gaming motivation mediated the relationship between gamers' psychological needs and life satisfaction, answering the second research question.

In Model 3, similar to Model 2, there was a strong positive correlation between gamers' relationship satisfaction and both their psychological needs and gaming motivation, which indicated that psychological needs predicted gamers' relationship satisfaction. Relatedness was found to be the strongest predictor of gamers' relationship satisfaction, but competence was significant as well. These findings indicated that gaming motivation mediated the relationship between psychological needs and gamers' relationship satisfaction, answering the third research question.

All three models indicated gaming motivation to be a significant mediator, and relatedness and competence were significant in more than one model. The interpretation of these relationships is presented in the next section.

Interpretation of the Findings

Preliminary analysis indicated that most participants preferred only playing MMORPGs compared to only virtual reality games or a combination of both. This finding is in line with "How Persistent" (2009), which indicated that MMORPGs are the more popular type of game. The average total playing time found in the current study was 15.76 hours, with a few extreme values of up to 100 hours a week, which is also consistent with a previous report on gaming behavior by Van Rooij et al. (2010). In this study participants played an average of 8.32 times a week.

The ages of the study participants ranged from 18 to 67, which is consistent with Yee (2006) who found that gamers ranged in age from young children to adults. The ethnicities of the participants included Caucasian, African American, Hispanic, Asian, Native American, Native Hawaiian, and Other/Unspecified, which is in line with the findings of Kenny and Gunter (2008) and Yee, who reported that gamers come from all ethnicities. The sample size was large (N = 935), but because the survey was available only in English, many gamers were eliminated from the study worldwide because they could not speak English. Additional research could shed more light on the generalizability of these findings by including non-English-speaking players.

The study did not address whether participants came from different countries, but future studies should include participants' home countries. Most participants were male (53.7%), which is consistent with the "Top 10 Industry Facts" (2008) report, which found that female gamers now compose approximately 40% of players. In the following sections, I discuss the study findings in the context of the theoretical framework and related literature. I also present the limitations of the study, recommendations for actions, recommendations for future studies, and implications for positive social change.

Theoretical Framework/Literature Review

The theoretical framework of this study was based on Deci and Ryan's (1985) self-determination theory (SDT), which states that human motivation and personality, including people's inherent growth tendencies and innate psychological needs, have three components: (a) autonomy, (b) competence, and (c) relatedness. Because motivation is a

significant part of SDT, a gaming motivation scale was developed (Lafreière et al., 2012). Gaming motivation is defined as how motived an individual is to play a game (Lafreière et al., 2012). The scale of gaming motivation used by Lafreière et al. (2012) was based on an SDT framework and comprised the following motivations: intrinsic, extrinsic (including integrated regulation, identified regulation, introjected regulation, external regulation), and amotivation. This study included an overall gaming motivation score instead of addressing each of participants' motivations, but individual motivation is something that should be addressed in future studies.

According to Lafrenière et al. (2012), gaming motivation is defined as how motivated or unmotivated a gamer is to play a game. One key component of this study was to examine gaming motivation as a mediator between psychological needs and gaming behavior, life satisfaction, and relationship satisfaction. I did not consider intrinsic motivation as a distinct variable but instead used overall motivation. Future research into gaming motivation should address the distinct qualities of gaming motivation that were not addressed here.

Model 1

Based on the study results, I rejected the first null hypothesis because psychological needs significantly predicted the duration of online gaming behavior. The relationship between psychological needs and duration of game play per week was statistically significant, $R^2 = .025$, $F(3,931) = 7.916$, $p < .001$. Using Cohen's d effect size calculation for R^2 ($f^2 = \frac{R^2}{1-R^2}$), the calculated effect size was small, $f^2 = .03$. Thus, there

was only 2.5% variance in duration of game play per week, which meant that 97.5% was not explained. This could have occurred due to a measurement problem or that the variables that predict gaming behavior were not included in this model. Examining the psychological needs variables separately indicated that relatedness (β = .103, t = 2.342, p =.019) was significant. Hutman et al. (2012) defined relatedness as the feeling of being connected and close to significant others, while Teng et al. (2012) stated that relatedness should exist among game players because loyalty forms during games in which individuals depend on one another. According to Young (2009), research has also shown that adolescents who engaged in problematic online gaming suffered from weak real-life interactions with family and friends. Thus, the gamers played longer when their psychological need for relatedness was strongest. In regard to competence, Grouzet et al. (2004) found that competence influenced a gamer's performance, and Freddolino and Blaschke (2008) found that competence was a powerful attraction for a player to continue playing.

Sharma and Smith (2011) showed that motivation was a significant part of why gamers play online. In the current study, a gamer's motivation did not mediate the relationship between his or her psychological needs and gaming behavior. Thus, the second null hypotheses of the first two research questions were retained, indicating that gaming motivation did not have any influence on the effect of psychological needs in predicting gaming behavior. The overall model of psychological needs and gaming motivation as predicators of gamers' game behavior was not found to be statistically

significant (R^2 = .005, $F(2,932)$ = 67.328, p =.170). Using Cohen's d effect size calculation for R^2 ($f^2 = \frac{R^2}{1-R^2}$), the calculated effect size was very small, f^2 = .005. The indirect effect (via gaming motivation) was significant (b = .75, *SE* = .110, 95% CI = -.039, .376). The fact that gaming motivation was not found to be a mediator between gamers' psychological needs and gaming behavior was surprising because there is literature (Lafreière et al., 2012; Sharma & Smith, 2011) that supports the impact of gaming motivation on gaming behavior. In fact, these studies indicated that gaming motivation decreased the relationship between psychological needs and gaming behavior. However, there were no studies that addressed the effect of gaming motivation as a mediator between psychological needs and gaming behavior. Although Lafreière et al. (2012) examined all 12 aspects of gaming motivation; the current study included only the overall gaming motivation. Therefore, additional research into gaming motivation as a mediator between psychological needs and gaming behaviors, particularly the specific motivators that compose gaming motivation, may be necessary.

Model 2

According to Drobnič et al. (2010), life satisfaction is defined as a person's overall cognitive assessment of his or her career, health, family, and anything else that impacts his or her overall life satisfaction. Ryan and Deci (2000b) theorized that a person needs a motivator to achieve optimal well-being, while Freddolino and Blaschke (2008) indicated that the primary motivator for gamers is the mastery of tasks. Despite this, autonomy turned out not to have any effect on gamers' life satisfaction in this study.

Furthermore, Chen et al. (2008) concluded that a person's life satisfaction is derived from leisurely pursuits of online gaming, which corroborated results from the current study. The first null hypothesis of the second research question was rejected, confirming that overall psychological needs significantly predicted gamers' life satisfaction. Ryan and Deci (2000b) mentioned that psychological needs are a motivator in a person's overall life satisfaction.

The overall model of psychological needs as a predictor of gamers' life satisfaction was statistically significant, $R^2 = .273$, $F(3,931) = 116.476$, $p < .001$. Using Cohen's d effect size calculation for R^2 ($f^2 = \frac{R^2}{1-R^2}$), the calculated effect size was large , $f^2 = .3786$. When examining the psychological needs variables as distinct components, competence ($\beta = .358$, t = 9.213, $p < .001$) was a significant factor, as was relatedness ($\beta = .166$, t = 4.359, $p < .001$). Johnston and Finney (2010) defined competence as the perception that a person is both capable of effecting and undertaking challenging tasks of varying levels. In the current study, a strong association was found between a gamer's competence and his or her life satisfaction. This was consistent with three of four studies that included SDT, which indicated that gamers' perceived competence and autonomy were associated with gaming motivation and life satisfaction (Ryan et al., 2006). Gaining new skills or abilities and being challenged enhances a person's competence, which in turn enhances his or her intrinsic motivation (Gagné & Deci, 2005; Ryan & Deci, 2000a). Rabideau (2005) reported that it is important to measure gaming motivation because motivation is the driving force behind people's actions.

In this study, it was found that a gamer's motivation mediated the relationship between his or her psychological needs and life satisfaction. When gaming motivation was a mediator between psychological needs and life satisfaction, 18.4% of the variance in life satisfaction was accounted for, compared to 0.08% without gaming motivation as a mediator. The second null hypothesis of the second research question was rejected, confirming gaming motivation as the mediator between psychological needs and gamers' life satisfaction. The overall model included psychological needs and gaming motivation as predicators of gamers' life satisfaction, and this was statistically significant $R^2 = .281$, $F(2,932), = 161.805, p < .01$). Using Cohen's d effect size calculation for R^2 ($f^2 = \frac{R^2}{1-R^2}$), the calculated effect size is large , $f^2 = .3908$. This is the first study to examine the effect of gaming motivation as a mediator between psychological needs and life satisfaction, and it was found to be significant. The indirect effect (via gaming motivation) was significant (b = .160, *SE* = .098, 95% CI = .021, .383).Gaming motivation as a mediator provided knowledge and to see the relationship between gamers' psychological needs and life satisfaction; plus, seeing that some psychological needs play a more intertwined part with one's life satisfaction than others. This study fits with the current research because it is looking at the relationship of gaming motivation with different variables such as gaming behavior, life satisfaction, and relationship satisfaction. According to Deci and Ryan (2000), people who lack motivation, also lack a sense of personal causation, which will result in not valuing their actions that they perform. This theory ties into how long the online gamers play their games. Ryan at el. (2006) found gamers' attempts to satisfy

some of their psychological needs by playing online games, which impacts the gamers' psychological well-being.

Model 3

According to La Guardia and Patrick (2008), relationship satisfaction is determined by the amount, manner, and degree of success that an individual experiences when interacting with other people. Residents of online games (avatars) explore the world by socializing, partaking in individual and group activities, and using online services (Coyne et al., 2009; Deanult & Kienzle, 2011; Noor & Lobeck, 2009). It has even been found that while in the virtual world, relationships can form between players (Hsu et al., 2007). In this study, the first null hypothesis of the third research question was rejected, confirming that overall psychological needs predicted gamers' relationship satisfaction. The overall model included psychological needs as predictors of gamers' relationship satisfaction $R^2 = .173$, $F(3, 931) = 64.976$, $p < .001$. Using Cohen's d effect size calculation for R^2 ($f^2 = \frac{R^2}{1-R^2}$), the calculated effect size was medium , $f^2 = .2092$. Relatedness ($\beta = .258$, $t = 6.34$, $p < .001$) was a significant psychological needs variable, followed by competence ($\beta = .195$, $t = 4.713$, $p < .001$), in predicting gamers' relationship satisfaction. Hutman et al. (2012) found that relatedness included inviting others to participate, giving positive feedback, helping others, and expressing belonging. The psychological needs of relatedness showed up to be significant for gamers, which makes since due to all humans have a need to feel connected to other's living beings, which impacts one's overall relationship satisfaction even if the connections are virtual or real

(La Guardia & Patrick, 2008). This study found that gamers' motivation mediated the relationship between their psychological needs and relationship satisfaction. The second null hypothesis of the third question was rejected, confirming that gaming motivation mediated the relationship between gamers' psychological needs and relationship satisfaction. The overall model included psychological needs and gaming motivation as predicators of gamers' life satisfaction, and was statistically significant, $R^2 = .184$, $F(2,932) = 70.633$, $p < .01$. Using Cohen's d effect size calculation for R^2 ($f^2 = \frac{R^2}{1-R^2}$), the calculated effect size was medium, $f^2 = .2255$. The indirect effect (via gaming motivation) was also significant (b = .017, *SE* = .014, 95% CI = .004, .057).

One surprising result of this study was that all three models tested were found to have no significant relationship between psychological needs and gaming behavior in regards to the frequency of game play (i.e., number of times a week). Likewise, players' gaming motivation did not mediate the relationship between their psychological needs and the frequency of their online game play. This was unexpected given that previous studies (Kowert et al., 2012; Kuss & Griffiths, 2012; Suárez & Singh, 2013) have shown that gaming behavior as measured by frequency of play is a valid measurement. Unfortunately, frequency of game play was likely not an appropriate measure of gaming behavior in this study. The frequency of game playing being an inappropriate measure might have occurred due to most studies have examined the duration of time spent (i.e. 2 hours versus 12 hours at a time) instead of how often the gamers play.

A second surprising result was the lack of a significant relationship between the gamers' psychological need of autonomy and the three dependent variables (i.e., gaming behavior, life satisfaction, and relationship satisfaction), given that there are ample studies in the literature that have found autonomy to be related to positive functioning (Ryan et al., 2006; Shaski et al., 2010). Shaski et al. (2010) found that the need for autonomy when playing video games resulted in positive outcomes; therefore, autonomy led to enhanced gratification and the need to play more in the future. This finding is in contrast to what other studies have found. In the current study, this has occurred due to the design did not address autonomy specifically enough.

Based on the existing literature and the limitations of this study, additional research on autonomy and gaming behavior, life satisfaction, and relationship satisfaction is clearly necessary. This study provided us with knowledge knowing that gaming motivation as a mediator allows a researcher to see that there was a relationship between gamers' psychological needs and life satisfaction and relationship satisfaction; plus, seeing that some psychological needs play a more intertwine part with gaming such as life satisfaction than with gaming behavior or relationship satisfaction. The results show psychologists that there is more involved o online gaming, besides gaming behavior to playing virtual realities and MMORPGs games.

Limitations of the Study

One limitation of the study was that inaccurate or dishonest responses by participants could have contributed to skewed distributions of the variables of personal

needs, gaming motivation, gaming behavior, life satisfaction, and relationship satisfaction. This limitation to internal validity is often a consequence of anonymous, self-reporting survey research. Another internal validity issue concerned the research design. The collected data were cross-sectional, which prevented the determination of cause-and-effect relationships between personal needs, gaming motivation, gaming behavior, life satisfaction, and relationship satisfaction; thus, such inferences were impossible to make here. In regards to external validity, the nonrandom sampling strategy and English language requirement limited the generalization of these results to the larger online gaming population. There are two more limitations in this study. One is using the shorter BNSG-S scale instead of using the full Basic Needs Satisfaction in General Scale (Gagné, 2003). Lastly, using the overall gaming motivation score from the GAMS (Lafrenière et al., 2012), instead of examining each of the six subscales separated. Both limitations are discussed in more detail in recommendations for future research.

Recommendations for Action

The results of this study can be shared with the gaming community, both online gamers and game developers, to make them aware of how an individual's needs and gaming motivation may influence his or her participation in online games. These needs and motivations influence gamers' gaming behavior, life satisfaction, and relationship satisfaction. Making such knowledge widely available may encourage developers to consider meeting these needs as new platforms are created and implemented. Although game designers cannot control the different levels of psychological needs and gaming

motivation among players, they can ensure that MMORPGs and virtual reality game environments have components that take into account how these games impact the players' gaming behavior and well-being by having a knowledge of how their life satisfaction and relationship satisfaction can be impacted by their gaming behavior. For example, the game designer could make mandatory breaks after playing the online game for three hours straight, give rewards or prizes for only playing for a few hours at a time, or reveal a clue or cheat how to advance in the games after taking some mandatory breaks.

Recommendations for Future Research

Future studies would benefit from examining how a gamer's self-esteem impacts his or her gaming behaviors, psychological needs, life satisfaction, and relationship satisfaction. Self-esteem can be thought of as an evaluation of one's worth as a human being and is based on being oneself (Hodgins et al., 2007; Neff, 2011). Cast and Burke (2002) cited James (1890), who claimed that self-esteem is vital for one's mental well-being. According to Lafreniére, Bélanger, Sedikides, and Vallerand (2011), there exists interplay between self-esteem and a passion for a particular activity, such as online gaming. A gamer's self-esteem is impacted by how that individuals view his or her satisfaction with life and interpersonal relationships that one has, these aspects of a human being are intertwined with each other. Although research has indicated that obsessive online gaming resulted in depressed moods and low levels of life satisfaction (Meerkerk et al., 2010; Senol-Durak & Durak, 2011), there is little research on how self-

esteem influences gaming behavior and life satisfaction. Future research can use a quantitative approach that would employ a non-experimental design that using an instrument that is psychometrically sound such as the Rosenberg Self-Esteem Scale (RSES) (Rosenberg, 1965) because it is one of the most widely used measured of self-esteem for adult populations (Nho, 1999). A non-experimental design, such as a correlation design has an advantage that it lends itself to the evaluation of a real-life situation and is more feasible within the context of online gaming that allows it to be administered remotely.

This study was limited to using the overall gaming motivation score from the GAMS (Lafrenière et al., 2012). Whereas an overall total score for gaming motivations may be appropriate within this study, future studies may benefit from looking at all six subscales: intrinsic motivation, integrated regulation, identified regulation, introjected regulation, external regulation, and amotivation. Examining the six subscales independently would allow researchers to look at several different constructs behind gaming motivation rather than just the overall gaming motivation. Knowledge of how gaming motivation affects participants in virtual reality games and MMORPGs would allow both players and game designers to implement aspects that would be in the best interest to the gamer (Hussain & Griffiths, 2009b).

Another limitation of the present study was the use of the 9-item BNSG-S instead of the full Basic Need Satisfaction in General Scale that has 21 items (Gagné, 2003). Future studies may benefit from incorporating a more empirically-sound assessment of

psychological needs. The 21 item assessment allows for a more thoroughly examination of an individual's psychological needs instead of only examining three items that address each psychological needs (autonomy, relatedness, and competence), but due to the nature of this study, the 9-item assessment was used. Existing literature has shown that the satisfaction of a person's psychological and basic needs normally results in a healthy attitude and satisfaction with life; however, disrupting a person's personal needs can lead to maladjustment and unhappiness (Ryan & Deci, 2000).

Implications for Social Change

As online gaming increases worldwide, it is vital to understand how these games affect the participants (Worldwide Online, 2007). The need to understand how gaming motivation impacts a gamer's playing was also supported by Yee (2006). This study addressed a gap in the literature related to gaming motivation as a mediator between the gamer's psychological needs, gaming behavior, life satisfaction, and relationship satisfaction. It was found that gaming motivation mediated the relationship between the gamers' psychological needs, life satisfaction, and relationship satisfaction, but not gaming behavior. At the individual level, gamers will be able to make more informed decisions about their gaming behavior as a result of these findings; this study on could be done by gamers taking into account how gaming motivation and their personal needs can impact their life and relationship satisfaction. At the game design level, the findings will allow game developers to improve MMORPGs and virtual reality games. These improvements are likely to take into account how a gamer's personal needs and gaming

motivation impact his or her gaming behavior. As game developers try to appeal to the gamers' psychological needs of autonomy, relatedness, and competence, as well as their gaming motivation, they may incorporate specific activities into their game design as a result of this knowledge; thus encouraging participation in online games. Positive social change can be defined as any change transformation that results in having a positive outcome and can have many levels, such as family, individual, communities, organizations, or global. Therefore, the results of this study lay the basis for positive social change in the online gaming community due to it can impact on the gamers' lives, individuals, gaming community, and future research.

Conclusion

This dissertation include sample of online gamers who played MMORPGs and virtual reality games and consisted of five chapters. Chapter 1 provides an overview of the study, and Chapter 2 presents the relevant background literature and set the foundation for the purpose of the study. Chapter 3 describes the research method and design and Chapter 4 presents the study results. Finally, Chapter 5 presents the interpretations of the study findings as well as recommendations for future research.

This study expands the current knowledge related to online gaming behavior using gaming motivation as a unique mediator. This quantitative study investigated three mediational models to further understand the complex relationship between gamers' psychological needs, gaming behavior, and quality of life. The results revealed that gaming motivation was not a significant mediator of gaming behavior, but that it was a

significant mediator of the relationship between gamers' psychological needs and well-being. Such information is relevant to developers of MMORPGs and virtual reality games, as they need to be aware of how gamers' psychological needs, gaming motivation, gaming behavior, and quality of life influence their gaming behavior. These results will aid game designers in developing game activities that directly address gamers' needs. Thus, the findings of this study reveal important insights into the psychological needs, gaming motivation, gaming behavior, and quality of life of online gamers and create a foundation for future studies in this field.

References

Abramson, L. Y., Metalsky, G. I., & Alloy, L. B. (1989). Hopelessness depression: A theory-based subtype of depression. *Psychological Review, 96*(2), 358-372. doi:10.1037/0033-295X.96.2.358

Achab, S., Nicolier, M., Mauny, F., Monnin, J., Trojak, B., Vandel, P.,…Haffen, E. (2011). Massively multiplayer online role-playing games: Comparing characteristics of addict vs non-addict online recruited gamers in a French adult population. *BMC Psychiatry, 11.* doi:10.1186/1471-244X-11-144

American College Health Association. (2005) American college health association national college health assessment (ACHA-NCHA), Spring 2003 Reference Group Report. *J Am Coll Health,* 53(5):199-210. www.acha-ncha.org

Baird, C. (2010). How much Internet gaming is too much. *Journal of Addictions Nursing, 21*(1), 52-53. doi:10.3109/10884601003625688

Baron, R., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51*, 1173-1182. doi:0022-3514/89/$00.75

Barnett, E., & Casper, M. (2001). A definition of "social environment". *American Journal of Public Health, 91*(3), 465. Retrieved from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1446600/pdf/11249033.pdf

Benita, M., Roth, G., & Deci, E. L. (2013, July 29). When are mastery goals more adaptive? Depends on experiences of autonomy support and autonomy. *Advance Online Publication, 104(1).* doi:10.1037/a0034007

Beranuy, M., Carbonell, X., & Giffiths, M. D. (2013). A qualitative analysis of online gaming addicts in treatment. *Internal Journal of Mental Health Addiction, 11*, 149-161. doi:10.1007/s11469-012-9405-2

Bidee, J., Vantiborgh, T., Pepermans, R., Huybrechts, C., Willems, J., Jegers, M., & Hofmans, J. (2012). Autonomous motivation stimulates volunteers' work effort: A self-determination theory approach. *Voluntas*, 24(1). doi:10.1007//s11266-012-9269-x

Breuer, J., Kowert, R., Festl, R., & Quandt, T. (2015). Sexist games = sexist gamers? A longitudinal study on the relationship between video game use and sexist attitudes. *Cyberpsychology, Behavior, and Social Networking*, *18*,197-202. doi:10.1089/cyber.2014.0492

Burton, K. D., Lydon, J. E., D'Alessandro, D. U., & Koestner, R. (2006). The differential effects of intrinsic and identified motivation on well-being and performance: Prospective, experimental, and implicit approaches to self-determination theory. *Journal of Personality and Social Psychology, 91*(4), 750-762. doi:10.1037/0022-3514.91.4.750

Business Dictionary. (2015). Social contract. Retrieved from http://www.businessdictionary.com/definition/social-contract.html

Çankaya, Z. (2009). Autonomy support, basic psychological need satisfaction and subjective well-being: Self-determination theory. *Turkish Psychological Counseling & Guidance Journal*, *4*(31), 1. doi:10.1007/s11031-008-9095-z

Carver, C. S., & Scheier, M. F. (1990). Origins and functions of positive and negative affect: A control-process view. *Psychological Review*, *97*(1), 19-35. doi:10.1037/0033-295X.97.1.19

Cast, A. D., & Burke, P. J. (2002). A theory of self-esteem. *Social Forces*, *80*(3), 1041-1068. doi:10.1353/sof.2002.0003

Charlton, J. P., & Danforth, I. D. W. (2007). Distinguishing addition and high engagement in the context of online gaming. *Computers in Human Behavior*, *23*, 1531-1548. doiI:10.1016/j.chb.2005.07.002

Chen, L., Tu, H., & Wang, E. (2008). Personality traits and life satisfaction among online game players. *Cyberpsychology & Behavior*, *11*(2), 145-149. doi:10.1089/cpb.2007.0023

Chiou, W., & Wan, C. (2007). Using cognitive dissonance to induce adolescents' escaping from the claw of online gaming: The roles of personal responsibility and justification of cost. *Cyberpsychology & Behavior*, *10*(5), 663-670. doi:10.1089/cpb.2007.9972

Cole, H., & Griffiths, M. D. (2007). Social interactions in massively multiplayer online role-playing gamers. *Cyberpsychology & Behavior*, *10*(4), 575-583. doi:10.1089/cpb.2007.9988

Conroy, D. E., & Coatsworth, J. D. (2007a). Assessing autonomy-supportive coaching strategies in youth sport. *Psychology of Sport & Exercise, 8*(2007), 671-684. doi:10.1016/j.psychsport.2006.12.001

Conroy, D. E., & Coatsworth, J. D. (2007b). Coaching behaviors associated with changes in fear of failure: Changes in self-talk and need satisfaction as potential mechanisms. *Journal of Personality, 75*, 383-419. doi:10.1111/j.1467-6494.2006.00443.x

Coyne, I., Chesney, T., Logan, B., & Madden, N. (2009). Griefing in a virtual community: An exploratory survey of Second Life residents. *Zeitschrift Für Psychologie. Journal of Psychology, 217*(4), 214-221. doi:10.1027/0044-3409.217.4.214

Creswell, J. W. (2009). *Research design: qualitative, quantitative, and mixed methods approaches. (*3rd ed). Thousand Oaks, CA: Sage.

Cronbach, L. J. (1988). *Five perspectives on validity argument*. In H. Wainer & H. Braun (Eds.), Test validity (pp. 3-17). Hillsdale, NJ: Lawrence Erlbaum.

Davis, R. A. (2001). A cognitive-behavioral model of pathological internet use. *Computers in Human Behavior, 17*(2), 187-195. doi: org/10.1016/S0747-5632(00)00041-8

Deci, E. L., Eghrart, H., Patrick, B. C., & Leone, D. R. (1994). Facilitating Internalization: The self-determination theory perspective. *Journal of Personality, 62*, 120-142. doi: 10.1111/j.1467-6494.1994.tb00797.x

Deci, E. L., & Ryan, R. M. (1985). The General Causality Orientations Scale: Self-Determination. *Journal of Research in Personality*, *19,* 109-134. doi:0092-6566/85$3.00

Deci, E.L, & Ryan, R. M. Ed. (2002). *Handbook o f Self-determination Research.* New York: The University of Rochester Press.

Deci, E. L., Vallerand, R. J., Pelletier, L. G., & Ryan, R. M. (1991). Motivation and education: The self-determination perspective. *Educational Psychologist*, *2*6, 325-346. doi:10.1080/00461520.1991.9653137

Deci, E. L. & Ryan, R. M. (2008). Self-Determination Theory: A Marcotheory of Human Motivation, Development, and Health. *Canadian Psychology, 49,* 185-185. doi: 10.1037/a0012801

Deci, E. L., & Ryan, R. M. (2012). Self-determination theory in health care and its relations to motivational interviewing: A few comments. *The International Journal Of Behavioral Nutrition And Physical Activity*, 9. doi:10.1186/1479-5868-9-24

Denault, A., & Kienzle, J. (2011). Journey: a massively multiplayer online game middleware. *IEEE Software*, *28*(5), 38-44. doi:10.1109/MS.2011.88

Diener, E. (1984). Subjective well-being. *Psychological Bulletin, 95,* 542-575. Retrieved from http://www.apa.org/pubs/journals/bul/index.aspx

Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The Satisfaction with Life Scale. *Journal of Personality Assessment, 49*(1), 71-75. doi:10.1207/s15327752jpa4901_13

Domahidi, E., & Quandt, T. (2014). "And all of a sudden my life was gone.": a biographical analysis of highly engaged adult gamers. *New Media & Society*, 1-14. doi:10.1177//1461444814521791.

Downing, S. (2010). Online gaming and the social construction of virtual victimization. *Eludamos. Journal for Computer Game Culture, 4 (2),* 287-301. Retrieved from http://www.eludamos.org/index.php/eludamos/article/viewArticle/vol4no2-11/190.

Drobnič, S., Beham, B., & Präg, P. (2010). Good job, good life? Working conditions and quality of life in Europe. *Social Indicators Research*, *99*(2), 205-225. doi:10.1007/s11205-010-9586-7.

Entertainment Software Association. (2009). *Essential facts about the computer and video game industry*. Retrieved from http://www.thesa.com/facts/pdf/ESA-_EF_2009.pdf.

Entertainment Software Association (ESA), (2014). "*2014 Sales, Demographic, and usage Data: Essential Facts about the computer and video game industry*." Retrieved from http://www.theesa.com/wp-content/uploads/2014/10/ESA_EF_2014.pdf

Faul, F (2014). *G*power version 3.1.9.2*. Germany: Universitat Kiel.

Fairchild, A. J., & MacKinnon, D. P. (2009). A general model for testing mediation and moderation effects. *Pre Science, 10*, 87-99. doi: 10.1007/s11121-008-0109-6.

Fang, K., Lin, Y., & Chuang, T. (2009). Why do internet users play massively multiplayer online role-playing games?: A mixed method. *Management Decision, 47*(8), 1245-1260. doi: 10.1108/00251740910984523

Faye, C., & Sharpe, D. (2008). Academic motivation in university: The role of basic psychological needs and identity formation. *Canadian Journal of Behavioral Science*, *40*(4), 189-199. doi:10.1037/a0012858

Frankfort-Nachmias, C., & Nachmias, D .(2008) *Research methods in the social sciences*. (7th ed). New Your, New York: Worth.

Freddolino, P. P., & Blaschke, C. M. (2008). Therapeutic applications of online gaming. *Journal of Technology In Human Services*, *26*(2-4), 423-446. doi:10.1080/15228830802099998

Fritz, M. S., & MacKinnon, D. P. (2007). Required sample size to detect the mediated effect. *Psychological science, 18*(3), 233-239. doi: 10.1111/j.1467-9280.2007.01882.x

Gagné, M. (2003). The role of autonomy support and autonomy orientation in pro-social behavior engagement. *Motivation and Emotion, 27,* 199-223. doi: 0146-7239/03/0900-0199/0

Gagné, M., & Deci, E. L. (2005). Self-determination theory and work motivation. *Journal of Organizational Behavior*, *26*, 331-326. doi:10.1002/job.322

González-Herero, V., & García-Martín, M. (2012). Personality, activities, and well-being: A study based on women in late adulthood. *Journal of Women & Aging, 24*(2), 152-168. doi:10.1080/08952841.2012.639662

Graham, J.M., Diebels, K.J., & Barnow, Z.B. (2011). The reliability of relationship satisfaction: A reliability generalization meta-analysis. *Journal of Family Psychology, 25*, 39-48. doi:10.1037/a0022441

Gravetter, F. J., & Wallnau, L. B. (2009). Correlation. *Statistics for behavioral sciences* (8^{th} ed), 519-562.

Gresham, F. M. (2014). "Measuring and analyzing treatment integrity data in research". In t*reatment integrity: A foundation for evidence-based practice in applied psychology*, 109-130. Washington, DC, US: American Psychological Association, 2014.

Griffiths, M. (2010). Online video gaming: what should educational psychologists know? *Educational Psychology in Practice, 26*(1), 35-40. doi:10.1080/02667360903522769

Griffiths, M., Davies, M, & Chappell. D (2003). Online computer gaming: a comparison of adolescent and adult gamers. *Journal of Adolescence, 27*, 87-96. doi.org/10.1016/j.adolescence.2003.10.007

Griffiths, M., Davies, M., & Chappell, D. (2004). Demographic factors and playing variables in online computer gaming. *CyberPsychology and Behavior, 7*, 479-487. doi: doi:10.1089/cpb.2004.7.479

Grimm, K. K., & Widaman, K. F. (2012). Construct validity. In H. Cooper, P. M., Camic, D. L., Long, A. T., Panter, D., Rindskoph, K. J. Sher,..K. J. Sher. (Eds.). *APA handbook of research methods in psychology, Volume 1: Foundations, planning, measures, and psychometrics* (pp. 621-642). Washington, DC, US: American Psychological Association. doi: 10.1037/13619-033

Gross, E. F. (2009). Logging on, bouncing back: An experimental investigation of online communication following social exclusion. *Developmental Psychology, 45*(6), 1787-1793. doi:10.1037/a0016541

Grouzet, F. M.E., Valleranad, R. J., Thill, E. E., & Provencher, P. J. (2004). From environmental factors to outcomes: A test of integrated motivational sequence. *Motivation and Emotion*, 28, 331-346. doi:10.1007/s11.31-004-2387-z

Guay, F., Delisle, M., Fernet, C., Julien, É., & Senécal, C. (2008). Does task-related identified regulation moderate the sociometer effect? A study of performance feedback, perceived inclusion, and state self-esteem. *Social Behavior & Personality: An International Journal*, *36*(2), 239-253. doi: https://doi.org/10.2224/sbp.2008.36.2.239

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York: The Guilford Press

Hawkins, B. P., & Hertlein, K. M. (2013). Treatment strategies for online role-playing gaming problems in couples. *Journal of couple & Relationship Therapy*, 12, 150-167. doi: 10.1082/15332691.2013.779100

Hellström. C, Nilsson, W.K., Leppert, J., & Åslund, C. (2012). Influences of motives to play and time spent gaming on the consequences of a adolescent online computer gaming. *Computers in Human Behavior, 28,* 1379-1987. doi:10.1016/j.chb.2012.023

Hendrick, S. S. (1988). A generic measure of relationship satisfaction. *Journal of Marriage & the Family, 50,* 93-98. doi: 10.2307/352430

Hendrick, S. S., Dicke, A., & Hendrick, C. (1995). Relationship Assessment Scale. *Journal of Social and Personal Relationships, 15*, 137-142. doi:10.1177/0265407598151009

Hendrick, S., & Hendrick, C. (2002). Love. In R. Snyder & S. J. Lopez (Eds.), *Handbook of positive psychology* (pp. 472–484). New York: Oxford University Press.

Hertlein, K. M., & Hawkins, B. P. (2012). Online gaming issues in offline couple relationships: A primer for marriage and family therapists (MFTs). *The Qualitative Report, 17,* 1-48. Retrieved from http://www.nova.edu/sss/QR/QR17/hertlein.pdf.

How Persistent is a Persistent Virtual World (2009, June). *Visual Purple understand everything*. Retrieved from http://blog.visualpurple.com/2009/06/08/how-persistent-is-a-persistent-virtual-world/

Hodgins, H. S., Brown, A. B., & Carver, B. (2007). Autonomy and control motivation and self-esteem. *Self & Identity, 6*(2/3), 189-208. doi:10.1080/15298860601118769

Huang, Y. (2006). Identity and intimacy crises and their relationship to internet dependence among college student's. *CyberPsychology & Behavior, 9*, 571-576. doi: 10.1089/cpb.2006.9.571

Huang, C. (2010). Internet use and psychological well-being: A meta-analysis. *Cyberpsychology, Behavior and Social Networking, 13*(3), 241-249. doi:10.1089/cyber.2009.0217

Hsu, C-L., & Lu, H-P. (2004). Why do people play on-line games? An extended TAM with social influences and flow experiences. *Information & Management, 41*, 853-868. doi:10.1016/j.im.2003.08.014

Hsu, M-H, Ju, T. L., Yen, C-H, Chang, C-M (2007). Knowledge sharing behavior in virtual communities: The relationship between trust, self-efficacy, and outcome expectation's. *International Journal of Human-Computer Studies, 65 (2)*, 153-169. doi: 10.1016/j.ijhcs.2006.09.003

Hussain, Z., & Griffiths, M. D. (2009a). The attitudes, feelings, and experiences of online gamers: a qualitative analysis. *CyberPsychology & Behavior*, *12*, 747-753. doi: 10.1089/cpb.2009.0059

Hussain, Z., & Griffiths, M. D. (2009b). Excessive use of massively multi-player online role-playing games: a pilot study. *Internal Journal Mental Health Addiction*, 7, 563-571. doi:10.1007//s11469-009-9209-8

Hutman, H., Konieczna, K., Kerner, E., Armstrong, C., & Fitzpatrick, M. (2012). Indicators of relatedness in adolescent male groups: Toward a qualitative

description. *Qualitative Report, 17,* 1-23. Retrieved from http://www.nova.edu/ssss/QR/QR17/hutman.pdf

Information Solutions Group. (2012). *Pop Cap: 2012 PopCap games mobile gaming research*. Retrieved from http://infosolutionsgroup.com/popcapmobile2012.pdf.

James, W. (1890). *Principles of Psychology*. Chicago: Encyclopedia Britannica.

Johnston, M. M. & Finney, S. J. (2010). Measuring basic needs satisfaction: Evaluating previous research and conducting new psychometric evaluations of the Basic Needs Satisfaction in General Scale. *Contemporary Educational Psychology, 35,* 280-296. doi:10.1016/j.cedpsych.2010.04.003

Johnson, S. (2013). "*State of Online Gaming 2013*." Retrieved from http://www.spilgames.com/state-online-gaming-2013-2/

Jolly, K., Duda, J. L., Daley, A., Eves, F. F., Mutrie, N., Ntoumanis, N., & ...Williams, G. C. (2009). Evaluation of a standard provision versus an autonomy promotive exercise referral programme: Rationale and study design. *BMC Public Health, 9*1-9. doi:10.1186/1471-2458-9-176

Kashdan, T. B., Julian, T., Merritt, K., & Uswatte, G. (2006). Social anxiety and posttraumatic stress in combat veterans: Relations to well-being and character strengths. *Behaviour Research and Therapy, 44,* 561-583. doi:10.1016/j.brat.2005.03.010

Kashdan, T. B., Mishra, A., Breen, W.E., & Froh, J. J. (2009). Gender differences in gratitude: Examining appraisals, narratives, the willingness to express emotions,

and changes in psychological needs. *Journal of Personality, 77,* 691-730. doi: 10.1111/j.1467-6494.2009.00562.x

Kasser, T., & Ryan, R. M. (1993). A dark side of the American dream: Correlates of financial success as a central life aspiration. *Journal of Personality and Social Psychology*, 65, 410–422. doi:10.1037//0022-3514.65.2.410

Kenny, D. A. (2014). Mediation. Retrieved from http://davidakenny.net/cm/mediate.htm

Kenny, R. F., & Gunter, G. A. (2008). Endogenous Fantasy -- Based Serious Games: Intrinsic Motivation and Learning. *International Journal of Social Sciences*, *2*(1), 8-13. Retrieved from http://ijhssnet.com/

Kipp, L. E., & Weiss, M. R. (2013). Social influences, psychological need satisfaction, and well-being among female adolescent gymnasts. *Sport, Exercise, And Performance Psychology*, *2*(1), 62-75. doi:10.1037/a0030236

Koestner, R., Otis, N., Powers, T. A., Pelletier, L., & Gagnon, H. (2008). Autonomous motivation, controlled motivation, and goals progress. *Journal of Personality, 76,* 1201-1229. doi: 10.1111/j.1467-6494.2008.00519.x

Kowert, R., Domahidi, E., Festl, R., & Quandt, T. (2014). Social gaming, lonely life? The impact of digital game play on adolescents' social circles. *Computers in Human Behavior*, 36, 385-390. Retrieved from http://dx.doi.org/10.1016/j.chb.2014.04.003

Kuss, D. J., Louws, J., & Wiers, R. W. (2012). Online gaming addiction? Motives predict addictive play behavior in massively multiplayer online role-playing games.

CyberPsycholgoy, Behavior, and Social Networking, *15*, 480-485. doi: 10.1089/cyber.2012.0034

Kwon, J., Chung, C., & Lee, J. (2011). The effects of escape from self and relationships satisfaction on the pathological use of Internet games. *Community Mental Health Journal, 47*(1), 113-121. doi:10.1007/s10597-009-9236-1

Lafrenière, M. K, Bèlanger, J. J. , Sedikides, C., & Vallerand, R. J. (2011). Self-esteem and passion for activities. *Personality and Individual Differences*, 51, 541-544. doi:10.1016/j.paid.2011.04.017.

Lafrenière, M. K., Vallerand, R. J., Donahue, E. G., & Lavigne, G. L. (2009). On the costs and benefits of gaming: The role of passion. *Cyberpsychology & Behavior*, *12*(3), 285-290. doi:10.1089/cpb.2008.0234

Lafrenière, M. K., Verner-Filion, J., & Vallernad, R. J. (2012). Development and validation of the Gaming Motivation Scale (GAMS). *Personality and Individual Differnces*, 53, 827-831. doi: 10.1016/j.paid.2012.06.013

La Guardia, J. G., & Patrick, H. (2008). Self-determination theory as a fundamental theory of close relationships. *Canadian Psychology/Psychologie Canadienne*, *49*(3), 201-209. doi:10.1037/a0012760

Legault, L., Green-Demers, I., & Pelletier, L. (2006). Why do school students lack motivation in the classroom? Toward an understanding of academic amotivaiton and the role of social support. *Journal of Educational Psychology, 96*(3), 567-582. doi: 10.1037/0022-0663.98.3.567

Lenhard, A., Kahne, J., Middaugh, E., Macgill, A., Evans, C., & Vitak, J. (2008). *Part 1.1: Who is playing games? Pew Research Center*. Retrieved from: http://www.pewinternet.org/2008/09/16/part-1-1-who-is-playing-games/

Lightsey, O. R., Maxwell, D., Nash, T., Rarey, E., & McKinney, V. (2011). Self-control and self-efficacy for affect regulation as moderators of the negative affect-life satisfaction relationship. *Journal of Cognitive Psychotherapy*, *25*(2), 142-154. doi:10.1891/0889-8391.25.2.142

Liu, H., Liu, J., & Chi, X. (2014). Regulatory mechanism of self-determination involvement in higher education: Accessing Chinese students and apos: experiences. *Higher Education: The Internal Journal of Higher Education and Educational Planning*, *67*, 51-70. doi:10.1007/s10734-013-9646-x

Liu, M., & Peng, W. (2009). Cognitive and psychological predictors of the negative outcomes associated with playing MMOGs (massively multiplayer online games). *Computers In Human Behavior*, *25*(6), 1306-1311. doi:10.1016/j.chb.2009.06.002

Lo, S., Wang, C., & Fang, W. (2005). Physical Interpersonal Relationships and Social Anxiety among Online Game Players. *Cyberpsychology & Behavior*, *8*(1), 15-20. doi:10.1089/cpb.2005.8.15

MacKinnon, D. P., Cheong, J., & Pirlott, A. G. (2012). Statistical mediation analysis. IN H. Cooper, P. M. Camic, D. L. Long, A. T. Panter, D. Rindskopf, K. J., Sher,..K., J. Sher (Eds.). *APA handbook of research methods in psychology, Volume 2: Research designs: quantitative, qualitative, neuropsychological, and biological*

(pp. 313-331). Washington, DC, US: American Psychological Association. doi:10.1037/13620-018

Matthews, Z., Brookes, M., Stones, R. W., & Hossain, M. B. (2005). Village in the city: autonomy and maternal health-seeking among slum populations of Mumbai. In S. Moore, (Ed.), *A focus on gender: Collected papers on gender* (pp. 69-89). Calverton, MD: ORC Macro.

McKenna, K. A., & Bargh, J. A. (2000). Plan 9 from cyberspace: The implications of the Internet for personality and social psychology. *Personality and Social Psychology Review*, *4*(1), 57-75. doi:10.1207/S15327957PSPR0401_6

Meerkerk, G. J., van den Eijnden, R. J. J. M., Franken, I. H. A., & Garretsen, H. F. L. (2010). Is compulsive internet use related to sensitivity to reward and punishment, and impulsivity? *Computers in Human Behavior*, *26*(4), 729–735. doi: 10.1016/j.chb.2010.01.009

Meyer, B., Enstrom, M. K., Harstveit, M., Bowles, D. P., & Beevers, C. G. (2007). Happiness and despair on the catwalk: Need satisfaction, well-being, and personality adjustment among fashion models. *The Journal of Positive Psychology*, *2*, 2-17. doi:10.1080/1743960601076635

Meyrowitz, J. (1986). *No sense of place: The impact of electronic media on social behavior*. New York. Oxford University Press.

Miller, J. G., Das, R., & Chakravarthy, S. (2011). Culture and the role of choice in agency. *Journal Of Personality And Social Psychology*, *101*(1), 46-61. doi:10.1037/a0023330

Misen,H. (2009, June 11*). Love is all you need: social relatedness, needs, materialism, and subjective well-being*. Happiness and Relational Goods conference, Venezia. Retrieved from http://www.narcis.nl/publication/RecordID/oai%3Atilburguniversity.edu%3Apublications%2F948df094-cf6a-444f-8ac4-48f1b09dead8

Miserandino, M. (1996). Children who do well in school: Individual differences in perceived competence and autonomy in above-average children. *Journal of Educational Psychology*, *88*(2), 203. doi:10.1037/0022-0663.88.2.203

Mobile Games Trend Report: *Why smartphone and tablet gaming is relevant for every game company*. (2012, March). Game market Research@NewZoo. Retrieved from http://www.newzoo.com/trend-reports/mobile-games-trend-report/#QRUMXcWKhe1MyLSS.99

Morahan-Martin, J., & Schumacher, P. (2000). Incidence and correlated of pathological internet use among college students. *Computers in Human Behavior*, *16*, 13-29. doi:10.1016/S0747-5632(99)00049-7

Mulligan, J. (1999). *Online game timeline*. Retrieved from http://www.skotos.net/articles/bth.htlm

Neff, K. D. (2011). Self-compassion, self-esteem, and well-being. *Social and Personality Psychology Compass*, *5*(1), 1-12. doi:10.1111/j.1751-9004.2010.00330.x

Ng, B. D. & Wiemer-Hastings, P. (2005). Addiction to the Internet and Online Gaming. *CyberPsychology & Behavior*, 9, 110-113. doi:10.1089/cpb.2005.8.110

Ng, J. Y., Ntoumanis, N., Thøgersen-Ntoumani, C., Deci, E. L., Ryan, R. M., Duda, J. L., & Williams, G. C. (2012). Self-determination theory applied to health contexts a meta-analysis. *Perspectives on Psychological Science, 7*(4), 325-340

Niemiec, C. P., Ryan, R. M., & Deci, E. L. (2009). The path taken: Consequences of attaining intrinsic and extrinsic aspirations in post-college life. *Journal of Research in Personality, 43,*291–306. doi:10.1016/j.jrp.2008.09.001

Noor, A. K., & Lobeck, W. E. (2009). Disruption from the virtual world: immersive, interactive simulated environments are no longer merely the purview of video gaming. They have the potential to remake fundamental engineering practices. *Mechanical Engineering, 131*(11), 22-28. Retrieved from https://www.omicsgroup.org/journals/applied-mechanical-engineering.php

NPD Group (2014). "*The NPD Group Reports 34 Million Core Gamers Spend an Average of 22 Hours per Week Playing Video Games*." Retrieved from https://www.npd.com/wps/portal/npd/us/news/press-releases/the-npd-group-reports-34-million-core-gamers-spend-an-average-of-22-hours-per-week-playing-video-games/

Parker, R. M. (1993). Threats to validity of research. *Rehabilitation counseling Bulletin, 36,* 130-138. doi:1993-23138-001.

Patrick, H., Knee, C. R., Canevello, A., & Lonsbary, C. (2007). The role of need fulfilment in relationship functioning and wellbeing: A self-determination theory perspective. *Journal of Personality and Social Psychology*, *92*, 434–457. doi:10.1037/0022-3514.92.3.434

Patrick, H., & Williams, G. C. (2012). Self-determination theory: Its application to health behavior and complementarity with motivational interviewing. *The International Journal of Behavioral Nutrition and Physical Activity*, 9. doi:10.1186/1479-5868-9-18

Pavot, W. & Diener, E. (1993) Review of the Satisfaction with Life Scale. *Psychological Assessment, 5,* 164-172. doi. 10.1037/1040-3590.5.2.164

Pavot, W., Diener, E., Colvin, C.R., & Sandvik, E. (1991). Further validation of the Satisfaction with Live Scale: Evidence for the cross-method convergence of well-being measures. *Journal of Personality Assessment, 57,* 149-161. doi:10.1207/s15327752jpa570701_17

Peng, W., & Liu, M. (2010). Online gaming dependency: A preliminary study in China. *Cyberpsychology, Behavior & Social Networking*, *13*(3), 329-333. doi:10.1089/cyber.2009.0082

Peng, W., Lin, J., Pfeiffer, K. A., & Winn, B. (2012). Need satisfaction supportive game features as motivational determinants: An experimental study of Self-

determination theory guided Exergame. *Media Psychology*, *15*, 175-196. doi: 10.1080/15213269.2012.673850

Peris, R., Gimeno, M. A., Pinazo, D. D., Ortet, G. G., Carrero, V. V., Sanchiz, M. M., & Ibáñez, I. I. (2002). Online chat rooms: Virtual spaces of interaction for socially oriented people. *Cyberpsychology & Behavior*, *5*(1), 43-51. doi:10.1089/109493102753685872

Proctor, C., Maltby, J., & Linley, P. (2011). Strengths use as a predictor of well-being and health-related quality of life. *Journal of Happiness Studies*, *12*(1), 153-169. doi:10.1007/s10902-009-9181-2

Rabideau, S. T. (2005). "Effects of achievement motivation on behavior." Retrieved from http://www.personalityresearch.org/papers/rabideau.html

Reis, H. T., Sheldon, K. M., Gable, S. L., Roscoe, J., & Ryan, R. M. (2000). Daily well-being: The role of autonomy, competence, and relatedness. *Personality and Social Psychology Bulletin, 26,* 419–435. Retrieved from http://www.spsp.org/

Reynolds, C. (2006). Videogame widows. *Macleans, 11*(3), 42. Retrieved from EBSOC.

Rouse, P. C., Ntoumanis, N. L., Duda, J. L., Jolly, K., & Williams, G. C. (2011). In the beginning: Role of autonomy support on the motivation, mental health and intentions of participants entering an exercise referral scheme. *Psychology & Health*, *26*(6), 729-749. doi:10.1080/08870446.2010.492454

Rosenberg, M. (1965). Society and the adolescent self-image. Princeton, NJ: Princeton University Press. See http://www.yorku.ca/rokada/psyctest/

Ryan, R. M., & Deci, E. L. (2000a). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology*, 25, 54-67. doi: 10.1006/ceps.1999.1020

Ryan, R. M., & Deci, E. L. (2000b). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*(1), 68-78. doi:10.1037/0003-066X.55.1.68

Ryan, M. & Deci, E. L. (2001). On happiness and human potentials: A review of research on hedonic and eudaimonic well-being. *Annual Review Psychology*, 52, 141-66. doi: 0666-4308/010/0201-0141$14.00

Ryan, R. M., Rigby, C., & Przybylski, A. (2006). The motivational pull of video games: A self-determination theory approach. *Motivation and Emotion, 30*(4), 347-363. doi:10.1007/s11031-006-9051-8

Scott, V. M., Monttarella, K. E., & Lavooy, M. J. (2006). Does virtual intimacy exist? A brief exploration into reported levels of intimacy in online relationships. *CyberPsychology & Behavior, 9*, 759-761. doi:10.1089/cpb.2006.9.759

Seok, S., & DaCosta, B. (2014). An investigation into the questionable practice of using excessively massively multiplayer online gamer play as a marker of pathological video game dependence among adolescent and young adult males players. *Psychology, 5,* 289-299. Retrieved from http://dx.doi.org/10.4236/psych.2014.54039

Senol-Durak, E., & Durak, M. (2011). The mediator roles of life satisfaction and self-esteem between the affective components of psychological well-being and the cognitive symptoms of problematic internet use. *Social Indicators Research, 103*(1), 23-32. doi:10.1007/s11205-010-9694-4

Sharma, M., & Smith, L. (2011). Self-Determination Theory and potential applications to alcohol and drug abuse behaviors. *Journal of Alcohol and Drug Education, 55*(2), 3-7. Retrieved from http://sdtheory.s3.amazonaws.com/SDT/documents/2011_Smith_JADE.pdf

Sheldon, K. M., & Kasser, T. (1998). Pursuing personal goals: Skills enable progress, but not all progress is beneficial. *Personality and Social Psychology Bulletin, 24*, 1319–1331. doi:10.1177/01461672982412006

Sheldon, K. M., Ryan, R. M., Deci, E. L., & Kasser, T. (2004). The independent effects of goal contents and motives on well-being: It's both what you pursue and why you pursue it. *Personality and Social Psychology Bulletin, 30*, 475–486. doi:10.1177/0146167203261883

Sheldon, K. M., & Schüler, J. (2011). Wanting, having, and needing: Integrating motive disposition theory and self-determination theory. *Journal of Personality and Social Psychology, 101*(5), 1106-1123. doi:10.1037/a0024952

Shieh, K-F., & Cheng, M-S. (2007). An empirical study of experiential value and lifestyles and their effects on satisfaction in adolescents: an example using online

gaming. *Adolescence*, *42*, 199-215. Retrieved from https://www.journals.elsevier.com/journal-of-adolescence/

Shrout, P. E., & Bolger, N. (2002). Mediation in experimental and nonexperimental studies: New procedures and recommendations. *Psychological Methods*, *7*, 422-445. doi:10.1037//1082-989X.7.4.422

Skinner, E. S., & Wellborn, J.G., & Connell, J. P. (1990). Coping during childhood and adolescence: A motivational perspective. In D. L. Featherman, R. M. Lerner, & M. Perlmutter (Eds) *Life-span development and behavior*, 2, 91-133. Hillsdale, NJ, Eribaum.

Smyth, J. M. (2007). Beyond self-selection in video game play: An experimental examination of the consequences of massively multiplayer online role-playing game play. *Cyberpsychology & Behavior*, *10*(5), 717-721. doi:10.1089/cpb.2007.9963

Spilgames. (2013). *State of online gaming report of 2013*. Retrieved from http://auth-83051f68-ec6c-44e0-afe5-bd8902acff57.cdn.spilcloud.com/v1/archives/1384952861.25_State_of_Gaming_2013_US_FINAL.pdf

Stangor, C. (2008). *Research methods for behavioral sciences*. Belmont, CA: Wadsworth Cengage Learning.

Stults-Kolehmainen, M.A., Gilson, T. A., & Abolt, C. J. (2013). Feelings of acceptance and intimacy among teammates predict motivation in intercollegiate sport.

Journal of Sport Behavior, *36*, 306-327. Retrieved from http://www.southalabama.edu/colleges/artsandsci/psychology/Journal_of_Sport_Behavior.html

Suárez, L., Thio, C. F. W., & Singh, S. (2012). Attachment Styles, Motivations, and Problematic Use of Massively Multiplier Online Gamers. Retrieved from http://wwwipedr.com/vol153/010-BCP2012-C00028.pdf. doi: 10.7763/IPED.2012.V53.10 outcomes: A test of integrated motivational sequence

Suárez, L. & Singh, S. (2013). Why people play massively multiplayer online games? *International Journal of e-Education, e-Business, e-Management, and e-Learning*, 3, 7-12. doi:10.7763/IJEEEE.2013.V3.184

Survey Money (2015). *"Create Surveys, Get Answers"*. Retrieved from https://www.surveymonkey.com/?ut_source=header.

Suler, J. (2004). The online disinhibition effect. *CyberPsychology and* Behavior, 7, 321-326. Retrieved from http://truecenterpublishing.com/psycyber/disingibit. html

Tavakkoli, A., Loffredo, D., Ward, Sr. M. (nd). Lesson from game studies to enhance gamification in education. Retrieved from http://www.uhv.edu/gaming/publicatons/Tav-14-GameCulture-WMSCI.pdf

Teng, C., Chen, M., Chen, Y., & Li, Y. (2012). Loyalty due to others: The relationships among challenge, interdependence, and online gamer loyalty. *Journal Of Computer-Mediated Communication, 17*(4), 489-500. doi:10.1111/j.1083-6101.2012.01586.x

Thorgersen-Ntoumani, C., & Ntoumanis, N. (2007). A self-determination theory approach to the study of body image concerns, self-presentation and self-perceptions in a sample of aerobics instructors. *Journal of Health Psychology, 12*, 301-315. doi:10.1177/1359105307074267

Top 10 industry facts. (2008). Washington, DC: Entertainment Software Association. Retrieved from http://theesa.com/facts/

Trochim, W. M. K. (2006). *Types of Designs*. Retrieved from http://www.socialresearchmethods.net/kb/external.php

Urbanoski, K., & Wild, T. C. (2012). Assessing self-determined motivation for addiction treatment: validity of the treatment entry questionnaire. *Journal Substance Abuse Treatment*, 43(1), 70-79. doi. 10.1016/j.jsat.2011.10.025

Vallerand, R. J. (2012). From motivation to passion: In search of the motivational processes involved in a meaningful life. *Canadian Psychology*, 53(1), 42-52. doi:10.1037//a0026377

Van Rooij, A. J., Schoenmakers, T. M., Vermulst, Ad. A., van den Eijnden R. J.J. M., & van de Mheen, D. (2010). Online video game addiction: Identification of addicted adolescent gamers. *Addiction, 106*, 205-212. doi. 10.1111/j.1360-0443.2010.03104.x.

Vansteenkiste, M., Lens, W., Soenens, B., & Luyckx, K. (2006). Autonomy and relatedness among Chinese sojourners and applicants: Conflictual or independent

predictors of well-being and adjustment? *Motivation and Emotion, 30,* 273-282. doi:10.1007/s11031-006-9041-x

Vansteenkiste, M., & Ryan, R. M. (2013). On psychological growth and vulnerability: Basic psychological need satisfaction and need frustration as a unifying principle. *Journal Of Psychotherapy Integration, 23*(3), 263-280. doi:10.1037/a0032359

Wan, C.S. and Chiou, W.B. (2006), "Psychological motives and online games addiction: a test of flow theory and humanistic needs theory for Taiwanese adolescents", *CyberPsychology &Behavior*, Vol. *9* No. 3, pp. 317-24.Retrived from http://researcher.nsc.gov.tw/public/wbchiou/Data/98291414271.pdf

Wan, C., & Chiou, W. (2006). Why are adolescents addicted to online gaming? An interview study in Taiwan. *Cyberpsychology & Behavior, 9*(6), 762-766. doi:10.1089/cpb.2006.9.762

Wan, C., & Chiou, W. (2007). The motivations of adolescents who are addicted to online games: A cognitive perspective. *Adolescence, 42*(165), 179-197. Retrieved from https://www.journals.elsevier.com/journal-of-adolescence/

Wang, C., Khoo, A., Liu, W., & Divaharan, S. (2008). Passion and intrinsic motivation in digital gaming. *Cyberpsychology & Behavior*, *11*(1), 39-45. doi:10.1089/cpb.2007.0004

Wei, H-T., Chen M-H., Huang, P-C, & Bai, Y-M. (2012). The Association between online gaming, social phobia, and depression: an internet survey. *BMC Psychiatry*, 12(92), 1-16. doi: 10.1186/1471-244X-12-92

Wei, M., Shaffer, P.A., Young, S.K., & Zakalik, R. A. (2005). Adult attachment, shame, depression and loneliness: The mediation role of basic psychological needs satisfaction. *Journal of Counseling Psychology,* 52, 591-601. doi:10.1037/0022-0167.52.4.591

Williams, G. C., Grow, V. M., Freedman, Z. R., Ryan, R. M., & Deci, E. L. (1996). Motivational predictors of weight loss and weight-loss maintenance. *Journal Of Personality And Social Psychology, 70*(1), 115-126. doi:10.1037/0022-3514.70.1.115

Williams, G. C., McGregor, H. A., & Sharp, D. (2006). Testing a self-determination theory intervention for motivation tobacco cessation: supporting autonomy and competence in clinical trail. *Health Psychology,* 25(1), 91-101. doi: 10.1037/0278-6133.25.1.91

Worldwide online gaming reaches 217 million people. (2007, July). *Marketing Charts Staff@ComScore*. Retrieved from http://www.marketingcharts.com/wp/interactive/worldwide-online-gaming-reaches-217-million-people-928/.

Yee, N. (2006). The demographics, motivations, and derived experiences of users of massively multi-user online graphical environments. *Presence: Teleoperators & Virtual Environments*, *15*(3), 309-329. doi:10.1162/pres.15.3.309

Young, K. (2009). Understanding online gaming addiction and treatment issues for adolescents. *American Journal Of Family Therapy*, *37*(5), 355-372. doi:10.1080/01926180902942191

Young, G., & Whitty, M. T. (2010). Games without frontiers: On the moral and psychological implications of violating taboos within multi-player virtual spaces. *Computers In Human Behavior*, *26*(6), 1228-1236. doi:10.1016/j.chb.2010.03.023

Yu-Tzu, C., & Lin, S. J. (2010). Early adolescent players' playfulness and psychological needs in online games. *Social Behavior & Personality: An International Journal*, *38*, 627-636. doi:10.2224/sbp.2010.38.5.627

Appendix A: Invitation to Participate in Online Study

You are invited to take part in a survey research project that examines the relationship between a gamer's psychosocial needs, gaming motivation, gaming behavior, life satisfaction, and relationship satisfaction. You are eligible for the study because you are an adult, needs to be or have been in a romantic relationship for at least a year, aged 18 or older, who engages in online game play. It should take from 10-20 minutes to complete your portion of the project, should you accept. You will be taken to the inform consent form once you select the link to the survey. Here is a link to the survey:

https://www.surveymonkey.com/r/9V8FPWT

I am a Clinical Psychology doctoral student at Walden University. Walden University's Institutional Review Board has approved this research for her doctoral dissertation.

Appendix B: Description of Age/Online Games/Hours played

Directions: Enter your responses to the following questions in the space provided. Please keep in mind that your responses are important to this study. The information that is collected through the course of this study will be used only for the purpose of this study and will not be sold or shared.

1. I acknowledge that I am 18 years or older and that I play online games. Checking yes would lead to the rest of the survey, while checking no would lead you to a thank you page anyway. If you stated yes, then you may continue with the study

    - Yes
    - NO

2. I acknowledge that I have or currently in a long term relationship for at least year or longer. If you stated yes, then you may continue with the study

    - Yes
    - No

3. Please check which form of online games you prefer to play the majority of the time.

    - Multiplayer online role-playing games (MMOROGs): Multiplayer Online Role- Playing Gaming (MMOROGs) is defined as virtual reality's games that provide a naturalistic setting in which numerous gamers play at the same time (Yee, 2006; Cole & Griffiths, 2007).
    - Online Virtual Realties Games: Online virtual games are games that are computer internet based and take place in a virtual reality environment that is consistently evolving and changing. They exist in a 3-D world

where players develop their own avatars (virtual representatives) of themselves (Denault & Kienzle, 2011).

4. How much time do you spend weekly playing online games? _____ #'s hours per week.
5. How many times out of week you play online games? _____# of times per week.

Appendix C: Sociodemographic Questionnaire

Directions: Enter your responses to the following questions in the space provided. Please keep in mind that your responses are important to this study. The information that is collected through the course of this study will be used only for the purpose of this study and will not be sold or shared.

1. What is your age? ____

2. What is your gender? ___

3. What is your relationship status?

- □ Single
- □ In a romantic relationship

4. Please define your ethnicity. Check all that apply.

- □ African American or Black
- □ Asian
- □ Caucasian
- □ Hispanic or Latino
- □ Native American/Alaska Native
- □ Native Hawaiian/Pacific Islander
- □ Other:_____

Appendix D: Gaming Motivation Scale (GAMS)

Intrinsic motivation
1. Because it is stimulating to play
2. For the pleasure of trying/experiencing new game options (e.g., classes, characters, teams, races, equipment)
3. For the feeling of efficacy I experience when I play

Integrated regulation
1. Because it is an extension of me
2. Because it is an integral part of my life
3. Because it is aligned with my personal values

Identified regulation
1. Because it is a good way to develop important aspects of myself
2. Because it is a good way to develop social and intellectual abilities that are useful to me
3. Because it has personal significance to me

Introjected regulation
1. Because I feel that I must play regularly
2. Because I must play to feel good about myself
3. Because otherwise I would feel bad about myself

External regulation
1. To acquire powerful and rare items (e.g., armors, weapons) and virtual currency (e.g., gold pieces, gems) or to unlock hidden/restricted elements of the game (e.g., new characters, equipment, maps)
2. For the prestige of being a good player
3. To gain in-game awards and trophies or character/avatar's levels and experiences points

Amotivation
1. It is not clear anymore; I sometimes ask myself if it is good for me
2. I used to have good reasons, but now I am asking myself if I should continue
3. Honestly, I don't know; I have the impression that I'm wasting my time

- 7 – Very strongly agree
- 6 – Mostly agree
- 5 – Somewhat agree
- 4 - Neither agree nor disagree
- 3 – Somewhat disagree
- 2 – Mostly disagree
- 1 – Do not agree at all

Appendix E: Basic Need Satisfaction in General-9 of 21 items (Gagné, 2003)

Feelings I have

Please read each of the following items carefully, thinking about how it relates to your life, and then indicate how true it is for you. Use the flowing scale to respond:

Scale						
1	2	3	4	5	6	7
Not at all true						Very True

Item	Code	Statement
1	A	I feel like I am free to decide for myself how to live my life/
2	R	I really like the people I interact with.
5	C	People I know tell me I am good at what I do.
8	A	I generally feel free to express my ideas and opinions.
9	R	I consider the people I regularly interact with to be my friends.
10	C	I have been able to learn interesting new skills recently.
12	R	People in my life care about me.
13	C	Most days I feel a sense of accomplishment from what I do.
17	A	I feel like I can pretty much be myself in my daily situations.

Appendix F: Satisfaction with Life Scale (SWLS)

Below are five statements that you may agree or disagree with. Using the 1 - 7 scale below, indicate your agreement with each item by placing the appropriate number on the line preceding that item. Please be open and honest in your responding.

- 7 - Strongly agree
- 6 - Agree
- 5 - Slightly agree
- 4 - Neither agree nor disagree
- 3 - Slightly disagree
- 2 - Disagree
- 1 - Strongly disagree

____ In most ways my life is close to my ideal.

____ The conditions of my life are excellent.

____ I am satisfied with my life.

____ So far I have gotten the important things I want in life.

____ If I could live my life over, I would change almost nothing.

- 31 - 35 Extremely satisfied
- 26 - 30 Satisfied
- 21 - 25 Slightly satisfied
- 20 Neutral
- 15 - 19 Slightly dissatisfied
- 10 - 14 Dissatisfied
- 5 - 9 Extremely dissatisfied

Appendix G: Relationship Assessment Scale (RAS)

Please mark on the answer sheet the letter for each item which best answers that item for you. Respondents answer each item using a 5-point scale ranging from 1 (low satisfaction) to 5 (high satisfaction).

How well does your partner meet your needs?

1	2	3	4	5
Poorly		Average		Extremely well

In general, how satisfied are you with your relationship?

1	2	3	4	5
Unsatisfied		Average		Extremely satisfied

How good is your relationship compared to most?

1	2	3	4	5
Poor		Average		Excellent

How often do you wish you hadn't gotten in this relationship?

1	2	3	4	5
Never		Average		Very often

To what extent has your relationship met your original expectations:

1	2	3	4	5
Hardly at all		Average		Completely

How much do you love your partner?

1	2	3	4	5
Not much		Average		Very much

How many problems are there in your relationship?

1	2	3	4	5
Very few		Average		Very many

Relationship Satisfaction Score:_____ (Add responses together and divide by 7). Score range: 1 (low satisfaction) to 5 (high satisfaction)